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In THE MUNICIPAL INDEX (the annual reference volume of data and condensed catalogs published by the American City Magazine Corporation) readers will find much material, including lists, and articles on a wide variety of municipal and civic subjects, not published in the monthly issues of the magazine.

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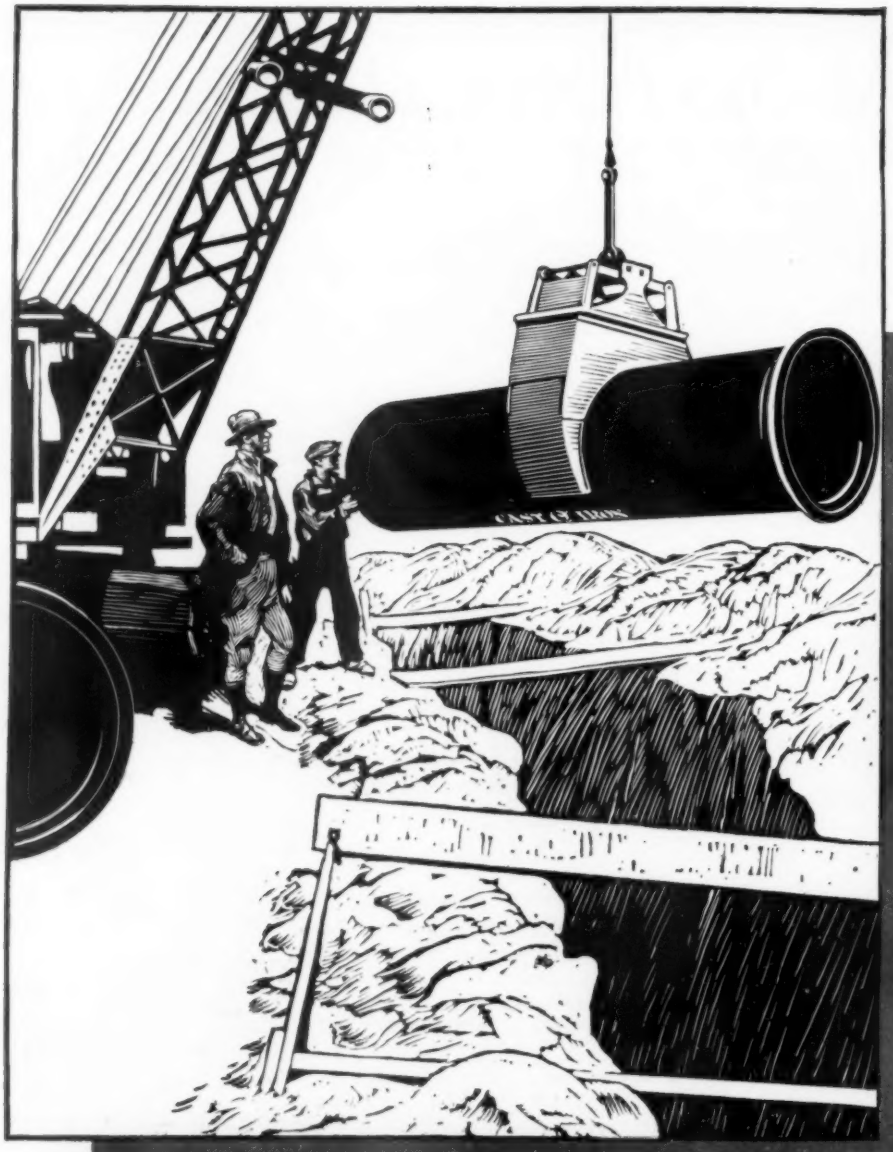

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To Speed the Flow of "Self-Liquidating" Projects

ESSENTIAL information for prospective applicants for Federal loans for "self-liquidating" projects under the Emergency Relief and Construction Act of 1932 is contained in Circular No. 3, just published (August 25, 1932) by the Reconstruction Finance Corporation.

The most puzzling question of all—just what types of public works will be regarded as self-liquidating?—has not yet had official action by the Corporation. The new circular does not rule specifically on such a list as was suggested on this page in THE AMERICAN CITY last month.* Instead, the circular says:

"A 'self-liquidating project' is defined in the Act as follows: '. . . a project shall be deemed to be self-liquidating if such project will be made self-supporting and financially solvent and if the construction cost thereof will be returned within a reasonable period by means of tolls, fees, rents, or other charges, or by such other means (other than by taxation) as may be prescribed by the statutes which provide for the project.'

"This provision of the Act clearly imposes the requirement that in order to be eligible for a loan the project must be one which will produce sufficient revenues to make it 'self-supporting' and to return its construction cost within a reasonable period. *Taxation* is expressly excluded as a source of revenue for such purposes.

"If the project meets these requirements its eligibility will not be affected by the fact that the power of taxation is additionally available for the payment of the loan.

"In case of doubt as to whether the revenues of the project may not be derived from taxation (for example, where such revenues are derived from assessments imposed substantially in proportion to the use of the facilities afforded by the project), it is suggested that applicants, *before preparing any formal application or other data with respect to the project*, furnish to the Reconstruction Finance Corporation proof that such revenues do not constitute taxation. Such proof should be accompanied by copies of all statutes, ordinances, and regulations providing for or applicable to the revenues to be derived from the project, together with full and detailed information as to the source and nature of such revenues, the exact basis on which they are to be assessed or collected, their relationship to the use of the project by those paying the same, and the purposes for which such revenues are to be used. In case of several classes or sources of revenue, full information should be given as to each and as to the expected amount thereof."

Apparently the interest rate to be charged on loans for such projects as may be approved by the Reconstruction Finance Corporation will depend on local conditions:

"Loans may be made for such periods . . ., in such amounts, at such rates of interest or discount, and on such terms and conditions, not inconsistent with the Act, as the board of directors of the Corporation may determine in each instance in the light of all the circumstances."

Courtesy of Pittsburgh-Des Moines Steel Co.

DOUBTLESS "SELF-LIQUIDATING"
Erection crew at work on an elevated tank for municipal water supply

Applications for Loans

Applications should be made in writing to the Reconstruction Finance Corporation at its office at 1325 H Street, N. W., Washington, D. C. (at which address single copies of Circular No. 3 are obtainable†). In view of the diverse types of projects eligible for loans, the Corporation has not deemed it advisable to prepare printed forms for applications. Circular No. 3 summarizes, however, in 45 numbered paragraphs the information which will be required in connection with each application filed. In a mimeographed memorandum accompanying the new circular the Engineers' Advisory Board suggests that it will be helpful to state briefly on the first page whether the body of the application contains full advice regarding the following matters:

Name and address of applicant.
Name and address of applicant's attorney and engineer.
Character of project.
Engineering reports on project.
Maps, plans, and specifications.
Engineer's detailed estimates of cost.
Estimates of income and its source (charges, assessments or taxes).
Amount of loan desired.
Purpose for which loan is sought.
What constitutes security for loan.
What evidences of indebtedness are to be used (notes, debentures, bonds, etc.).
Has the application for loan been legally authorized?
Have bonds or other securities been legally authorized and approved?
Advise specifically what effort has been made to finance project elsewhere.

Loans to Regulated Housing Corporations

With special reference to the provisions in the Emergency Relief and Construction Act for Federal aid to housing, Circular No. 3 says:

"Loans may be made only to corporations formed wholly for the purpose of providing housing for families of low income, or for reconstruction of slum areas.

"No such loan can be made unless the applicant corporation is regulated by law as to rents, charges, capital structure, rate of return, and areas and methods of operation. Prospective borrowers should therefore determine whether such a law is in force in the place where the project is to be erected. Helpful suggestions for legislation may be found in the New York State Housing Law, the pioneer act in the field.‡

"The loans must be to aid in financing projects undertaken by such corporations which are self-liquidating in character.

"The project should be approved by the local regulatory authority before application is made for a loan.

"Loans may be made for a period not exceeding ten years."

Need for Prompt Action

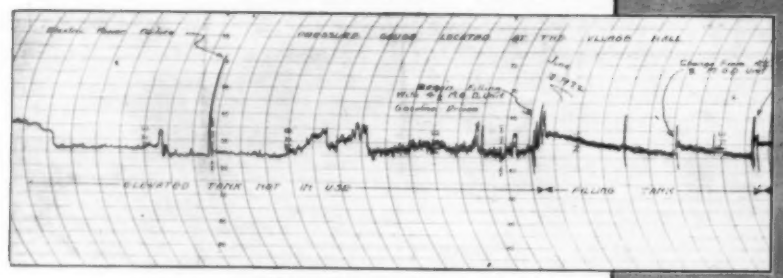
As many requests for loans have already been made to Washington, THE AMERICAN CITY renews the suggestion made last month that municipalities or counties desirous of securing Federal aid in the financing of public works projects would do well to file early application with the Reconstruction Finance Corporation. Before so doing, a copy of Circular No. 3 should, obviously, be secured.

* See also the text of the Act as published on pages 80-81 of the August issue.

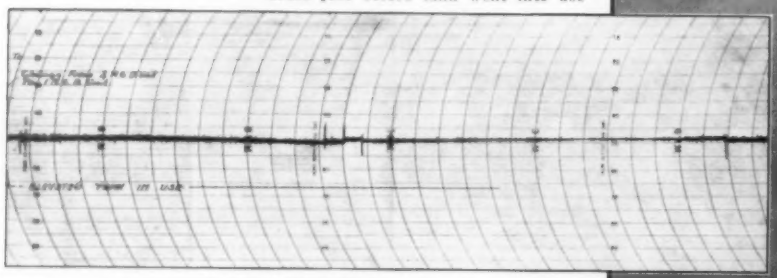
† If ordered from the United States Government Printing Office in Washington, the price of the pamphlet is 5c per copy, with a discount of 25 per cent in quantities of 100 or more; payment to be made in advance of shipment.

‡ See also outline of principles suggested for a model state housing law, prepared by a Committee of the American Institute of Architects, as published on pages 82 and 83 of the August number of THE AMERICAN CITY; and the abstract, on page 82 of the present issue, of a report of the Housing Committee of the Cleveland City Council.

At right: The half-million-gallon tank which now serves the Glencoe system



Above: Pressure chart covering sixteen hours just before tank went into use



Above: Same chart continued for sixteen hours after tank went into use

Glencoe, Illinois finds important advantages in...

HORTON TANKS

The water supply system of Glencoe, Illinois—a suburban community north of Chicago — has recently been improved by the installation of its first elevated storage, a 500,000-gallon Horton Tank. This system serves approximately 7300 people with an average consumption of 1 m.g.d., a maximum of 3.5 m.g. in 24 hours, and a minimum night rate of 200,000 g.p.d. In addition to domestic consumers, one industrial plant and four golf clubs are served.

The principal reasons for installing the tank, as given by Mr. Geo. R. Young, Village Manager, were: "To provide uninterrupted service in case of failure of power supply. To provide uniform pressure. To provide additional storage of filtered water for peak consumption. To increase economy by making it possible to use pumps at maximum efficiency."

The charts reproduced above indicate how the pressure was stabilized when the tank went into service. A substantial saving in operating costs has also been demonstrated.

Adequate elevated storage in Horton Tanks usually produces advantages such as these experienced by Glencoe. Perhaps your system can be improved by such an installation. Without any obligation to you, our nearest office will give you any facts you need when considering the advantages of a tank under your own conditions.

CHICAGO BRIDGE & IRON WORKS

Chicago	2127 Old Colony Bldg.
New York	3108 Hudson Terminal Bldg.
Cleveland	2236 Midland Bldg.
Detroit	1501 Lafayette Bldg.
Philadelphia	2616 "1616" Walnut Street Bldg.
Boston	1501 Consolidated Gas Bldg.
Birmingham	1502 Fiftieth St., N.
Dallas	1206 Burt Bldg.
San Francisco	1033 Rialto Bldg.
Seattle	4343 Smith Tower
Houston	2919 Main St.
Tulsa	1425 Philcade Bldg.
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Fabricating plants in CHICAGO, BIRMINGHAM, and GREENVILLE, PA.

AC 9—Gray

Pure Water—Man's Greatest Need

Items on Water Supply and Purification

Reducing Complaints by Informing School Children

THROUGH the cooperation of the principals of several of the high schools in New Brighton, Pa., arrangements are made each year for groups of students to visit the water plant during school hours. Usually, two classes, numbering between 40 and 60, are combined, allowing two hours for the trip. Each group is first given a brief, interesting talk on water and methods of water purification. Demonstrations are of particular interest to these students and include samples of water, showing the various steps through the plant, from raw to finished supply, a model filter in glass showing the construction of the filter bed, and bacterial cultures, with a short explanation of the control that is used to maintain a bacterially pure water.

Following the talk, the students are conducted through the plant, starting with the first step, and each step is taken in order until the high-service pumps are reached. Following the trip through the plant, the remaining time is used as a question period, when any detail that has been omitted, or which has not been fully answered, is taken care of. On leaving the plant, the students are invited to return at any time with their friends or parents. A large number accept this invitation.

Not only have high school students been taken through the plant, but other groups, clubs and church societies have taken advantage of the opportunity to learn about their water supply.

In the four years during which this plan has been fostered, there has been a marked reduction in complaints from consumers. Favorable comments, received from time to time from parents and friends of visitors that have been at the plant, indicate clearly that this plan has widespread influence in creating a better feeling toward the water utility and its supply.

E. C. GOEHRING,
Chemist, Beaver Valley Water Co., New Brighton, Pa.

Surface and Subsurface Waters and Vegetation

THE basic principles of hydrology as related to surface and ground water have an essential bearing on the effect of droughts. Vegetation also is an important factor. Of the water that reaches the earth by precipitation, a part is immediately returned to the atmosphere by evaporation, another part remains on the surface, as snow or impounded or in flowing streams, as surface water, and the remainder enters the ground and become subsurface or ground water.

The quantity and distribution of both surface and subsurface waters, and also their relations to each other, are determined by a combination of factors which may be included under climate, vegetation, topography, geology, geographic location and the works of man. With respect to the occurrence of subsurface water, the earth's crust may be divided into the zone of saturation and the zone of aeration. In the zone of saturation the interstices are filled with water under hydrostatic pressure. This zone constitutes the great reservoir from which stream flow is maintained and from which plants are, in part, fed during periods of slight rainfall. The water in this zone is commonly called ground water. In the zone of aeration the interstices are largely filled with air. Many of the interstices in this zone contain water, and at times some of them may be completely filled. This water is not, except temporarily, under hydrostatic pressure and is, for the most part, held by molecular attraction, which keeps it from being rapidly drawn down by gravity to the zone of saturation. This zone acts as a distributing reservoir, and its water content is subject to rapid changes and varies considerably in amount.

The depth of the water table or upper surface of the zone of saturation varies in different localities, depending upon topography and the geologic formation. It also has seasonal variations, which depend upon the differences in the rate at which water is taken into and discharged from the zone of saturation. These variations indicate and determine the gradient of the water table, as referred to sea level. The gradient is important as related to the amount of water that is released from the zone of saturation.

The zone of aeration may be divided with respect to the occurrence and circulation of its water into the belt of soil water, the intermediate belt, and the capillary fringe. The belt of soil water is the part of the earth's crust immediately below the surface, from which water is discharged into the atmosphere in perceptible quantities by evaporation from the soil or the action of plants. Its thickness is limited by the character of the vegetation and the texture of the earth's crust. It is essentially the same as the so-called "root zone."

The capillary fringe is the belt that overlies the zone of saturation and contains interstices some or all of which contain water that is continuous with the zone of saturation but is held above that zone by capillary action against gravity. Its thickness is determined by the texture of the material in which it occurs.

The intermediate belt is the residual part of the zone of aeration. Its thickness depends upon the depth to the water table and the thickness of the other two belts. It therefore varies in thickness and may be lacking entirely, the belt of soil moisture joining the capillary fringe. In general, the intermediate belt is of but little consequence in connection with water supplies.

The rainfall that passes below the surface first enters the belt of soil water, from which it is discharged in four ways: (1) to the atmosphere by evaporation directly from the soil; (2) to plants, which return a large portion of it to the atmosphere by transpiration; (3) to the surface water by shallow subsurface flow; (4) to the intermediate belt, through which it percolates and ultimately reaches the water table and is transferred to the zone of saturation.

Where the water table meets the earth's surface, springs occur and water flows from the zone of saturation upon the land surface or into a body of surface water. Where the water table is near the surface, water may be withdrawn from the zone of saturation by evaporation directly through the soil or by plants, mostly by transpiration. Water is also withdrawn from the zone of saturation through wells, filtration ditches, and tunnels.

Plants draw their moisture primarily from the earth through their root system and give it off by transpiration through their leaves. Root systems are particularly susceptible to the influence of changes in soil texture and moisture and are more or less modified by environment. There are wide variations in their character. Some penetrate deeply into the soil; others lie near the surface. The root systems reach out and take the water which is most easily available. Their principal source of supply is the zone of aeration. Water is drawn from the zone of saturation only where the water table is near the surface and by plants having long roots that penetrate well into the capillary fringe or below. The principal draft on the zone of saturation by vegetation is that from growth on land adjacent to watercourses.

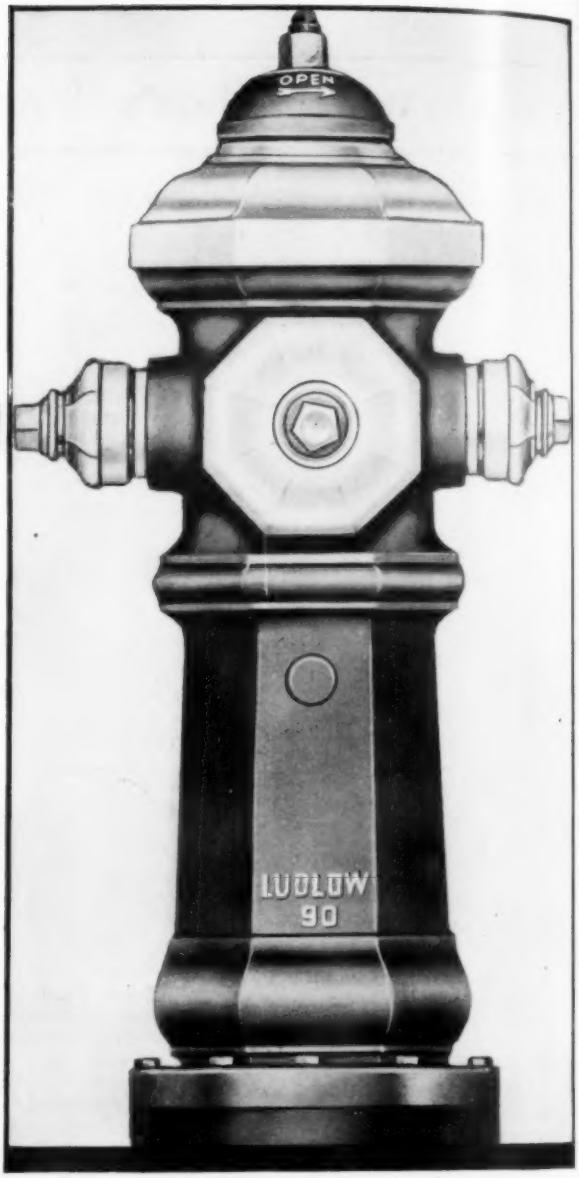
The precipitation reaches the surface streams either directly by flowing over the surface of the ground or indirectly through the ground, either as suspended water or as ground water. Low-water flows are derived from ground water; when this is supplemented by water from the zone of aeration, medium flows exist, and if there is an additional contribution from the surface, flood flows may be produced.

JOHN C. HOYT,
Hydraulic Engineer, U. S. Geological Survey, Washington, D. C.

READ THE 1932 MUNICIPAL INDEX

For the Cities of Today and Tomorrow

Adopted by 111 Cities *within* One Year



Why has city after city adopted the new Ludlow Diamond Fire Hydrant? The answer is easy. The Ludlow Diamond meets all the requirements of sound long-term investment.

Modern in design, keeping pace with progress, Ludlow Diamond Hydrants installed today will be modern thirty, forty, fifty years hence. Self-illuminating, their beveled reflecting surfaces add new factors of safety, while at the same time improved mechanical design establishes new standards of maintenance economy.

A cost of less than 2c per unit for repair parts is the record of over 8,000,000 Ludlow Valves and Hydrants in over 4,750 cities and towns. Ludlow economy helps keep tax rates down. When tax-payers' money is invested there should be no question — Ludlow offers the last word in modern design; Ludlow quality insures lasting economy.

The LUDLOW VALVE MFG. CO.

TROY · · · NEW YORK

1866 · First with the Gate Valve · · 1931 · The new Multi-Valve

Construction and Maintenance

Engineering and Highway Departments

Cost of Street Cleaning in Oak Park, Ill.

ALL paved streets in the residential districts in Oak Park, Ill., are cleaned once a week from February 15 to December 21. In the business districts the streets are cleaned every other day. During 1931, it was found necessary to keep one man at work continuously in the Avenue District and two men in the Lake-Marion District for cleaning streets and sidewalks. Streets north of Division Street and south of Madison Street, comprising approximately 5.065 gutter-miles, were cleaned with the motor pick-up sweeper. Between Madison Street and Division Street, the entire roadway area of approximately 3.757 gutter-miles was cleaned by hand. Five miles of business district streets are cleaned daily by a combination of motor sweepers and hand cleaning. Leaves picked up from the gutter are burned at the incinerator, and street sweepings are hauled to the city dump several miles from the center of the village.

A total of 12,708 cubic yards of dirt and leaves was removed at an average cost of $1.735 per cubic yard in 1931. A total of 8.822 gutter-miles of streets were cleaned at an average cost of $2.499 per gutter-mile. Estimating the average width of street cleaned as 18 feet, the total number of square yards swept during 1931 was 46,580,160, at an average cost of $0.000471 per square yard.

STREET-CLEANING EXPENDITURES

Labor	$19,834.85
Superintendence	926.75
Teams and trucks	1,155.75
Hired teams and trucks	1,047.00
Maintenance of sweeper	2,242.97
Miscellaneous supplies and equipment	308.07
	$25,515.39

DUDLEY C. MEYERS,
Commissioner of Public Works.

Accidents Prevented by Stopping Dust

ACCIDENTS at corners and on narrow gravel have been greatly reduced by applying calcium chloride as a dust layer. With the dust clouds stopped, drivers can see the position of other cars either day or night, and accidents are thus reduced.

Calcium chloride, manufactured by a number of large chemical companies, is a chemical compound in the form of small white flakes. The flakes do their work by absorbing moisture from the air, thus keeping the road surface damp, so that no dust rises.

There are many highways throughout the country that would be improved for both comfort and safety if made dustless in this manner. Highway officials find it easy to apply the material, stating that one truck and a simple spreader will dustproof many miles in a day.

CHARLES F. FOERSTER.

More Pavements at Lower Tax Rate Is City Problem

THE demand for lower taxes in cities, coupled with the need for more pavements, must be met by better classification of streets and the adoption of less expensive types of surface where traffic is not heavy, so that some type of surfaced street will be available for as many city dwellers as possible. This recommendation was made by a committee of the City Officials' Division of the American Road Builders' Association.

The committee recommends four classes of streets and three types of pavements approved for city work. Streets are classified into those in which (1) all cost is borne by abutting property, (2) cost is shared between abutting property and city, (3) property owners, city and county share cost, (4) property owners, city, county, and state share cost. Pavements are classified as (1) those best for main thoroughfares, (2) a less expensive pavement for secondary thoroughfares, where preferred, (3) a much cheaper pavement for the whole width of outlying streets, or a curbless, narrow pavement to permit traffic now impossible at some seasons of the year.

For every bit of pavement laid, the whole city benefits greatly. On some streets, such as dead ends, the benefit is essentially local, but on other streets benefits affect ever-widening areas until on some main streets interstate traffic is affected.

The committee report states that in 1930, out of $1,500,000,000 spent for highways, $1,000,388,000 came from motor vehicles. A minimum of 60 per cent of these tax receipts came from city-owned motor vehicles. A redistribution of motor-vehicle tax money is recommended that will give to cities a proportionate share.

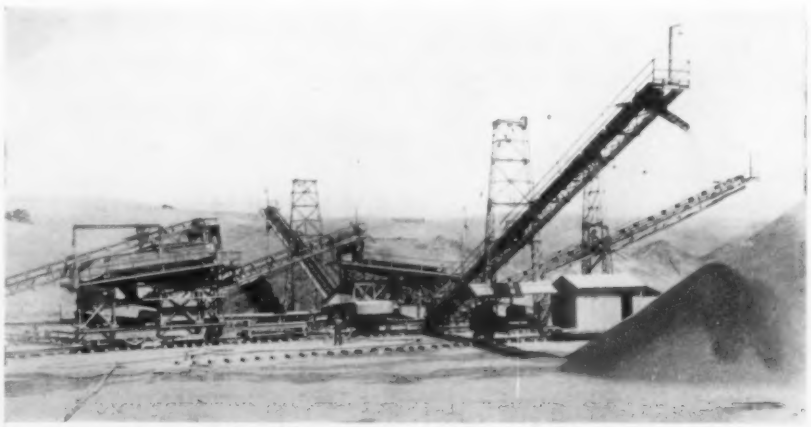
Gravel Plants for Hetch Hetchy Tunnel Lining

A SMALL sand and gravel plant has been in continual operation at Corral Hollow, where it stockpiled the material for use as aggregate for concrete lining of the Hetch Hetchy tunnel. The plant has produced up to 60,000 cubic yards of sand and gravel, of which over 10,000 cubic yards of sand have been used in placing Gunite concrete.

The portable gravel plant, with a rated capacity of 100 tons per hour, purchased from the Link-Belt Co., was put in service at Alameda Creek in November, 1930. It consists of a hopper and feeder unit, a scalping and crushing unit, and a screening and washing unit with necessary connecting belt conveyors and storage belt conveyors to place the classified aggregate in three stockpiles. The plant is somewhat of a novelty and therefore required adjustments before being put into operation. After several months of operation at Alameda Portals Camp, where it was first installed and where it stored sufficient sand and gravel aggregate to line the west 8½ miles of tunnel, the plant was moved to Corral Hollow, where it has been in operation for about one year.

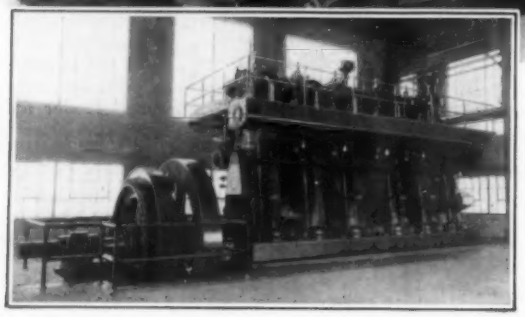
During the year 1931, the city and county of San Francisco purchased the mineral rights on an additional 33 acres of gravel land in Corral Hollow to insure sufficient aggregate to complete the Hetch Hetchy work in that district.

M. M. O'SHAUGHNESSY,
City Engineer.



THE PORTABLE GRAVEL PLANT USED ON THE HETCH HETCHY TUNNEL.

Where Quality Is Preferred



The illustration at the bottom shows the 1125-K. V. A. Nordberg Diesel in service since 1930; at the top the new 1250-K. V. A. Nordberg Diesel recently installed.

In addition to the wide range of Diesel Engines for practically every municipal requirement, Nordberg also builds a line of Uniflow Steam Engines where such equipment serves to better advantage.

A Second Nordberg Diesel Engine installed in the Municipal Power Plant at Lubbock, Texas

Among the many municipal power plants in Texas, that of the City of Lubbock stands out as remarkably successful. In the new plant erected two years ago, a Nordberg unit was installed replacing a number of smaller units in the old plant. In order to care for the growing load, a second Nordberg unit has just been placed in service. Lubbock officials appreciate the value of quality equipment. They know that it is a wise investment, one which pays big returns to buy better designed and better built Diesels.

NORDBERG MFG. CO., MILWAUKEE, WIS.

NORDBERG

Who's Who in Water Supply

One of a Series of Portraits of Water Works Officials Which Has Appeared Monthly Since January, 1928

T. A. LEISEN
General Manager
Metropolitan Utilities District
Omaha, Nebr.
(Appointed 1923)

FRED E. WILLIAMS
Supt., Water Works
Ogden, Utah
(Elected 1928)

S. F. NEWKIRK, JR.
Supt., Board of Water Commrs.
Elizabeth, N. J.
(Appointed 1931)

L. W. HELMREICH
Vice-Pres. & Mgr.
Capital City Water Co.
Jefferson City, Mo.
(Appointed 1926)

THOMAS C. NORTH
Supt., Water Works
Blairsville, Pa.
(Appointed 1922)

SAM C. HAYDEN
Supt., Water Department
Aberdeen, Wash.
(Appointed 1920)

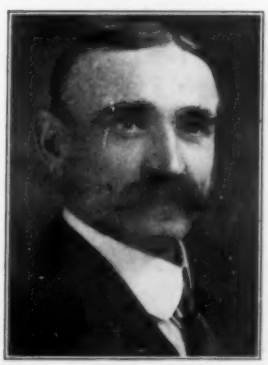
R. V. TOMS
Supt., Water Dept.
Shelby, N. C.
(Appointed 1921)

J. T. KINGSLEY
Supt., Water Works
Covington, Ky.
(Appointed 1930)

ANDREW B. MAUZY
Chief Engr., Bureau of Water
Jersey City, N. J.
(Appointed 1921)

M'KEAN MAFFITT
Supt., Water and Sewers
Wilmington, Del.
(Appointed 1919)

CHARLES F. BARNUM
Water Commissioner
Mankato, Minn.
(Appointed 1929)



JOHN B. HANEY
Supt., Water Works
Trenton, Mo.
(Appointed 1912)

WALTER F. HICKS
Supt., Water Works
Paris, Texas
(Appointed 1924)

LEONARD A. BERGMAN
Director of Public Works
Jamestown, N. Y.
(Appointed 1921)

Heenan System
Refuse Disposal Plants

THERE is no municipal work more dangerous to do ineffectively than sanitation. Most American cities and towns are, fortunately, beyond the stage of disposing of refuse in malodorous, unsightly and fly-breeding dumps. Many cities and towns, however, stop short at the barest requirements of sanitation by burning refuse in incinerators that depreciate property values and antagonize groups of citizens.

This is no longer necessary. Heenan System Refuse Disposal Plants built by the Hiler Engineering and Construction Company are civic assets in appearance and useful work, quite as much as any well run, architecturally attractive factories, and they create no nuisance.

These plants are self-liquidating within the meaning of the term as used by the Reconstruction Finance Corporation, and are in every sense necessary public works.

The Koppers Construction Company, whose success in building by-product coke plants is well known to industry, has recently acquired the Hiler Engineering and Construction Company. The Koppers Construction Company will coordinate the results of extensive studies here and abroad with the twenty-four years' experience of Heenan System Refuse Disposal Plants.

We invite municipal engineers and city executives to write for a catalog describing Heenan System Refuse Disposal Plants.

HILER ENGINEERING AND CONSTRUCTION COMPANY
SUBSIDIARY KOPPERS CONSTRUCTION COMPANY
KOPPERS BUILDING PITTSBURGH, PA.

Sewage Treatment Means Clean Streams

SEWERAGE and SEWAGE DISPOSAL

Brushes as Aerators

AN activated sludge sewage treatment plant was installed for one of the state hospitals in New Jersey and placed in operation on April, 1931. The units preceding the aeration tanks consist of coarse screens and preliminary settling tanks. The activated sludge is digested in a separate sludge-digestion tank in combination with the settled solids. Digested sludge is dried on conventional sand drying beds. The preliminary settling tank is of ordinary hopper bottom costruction with provisions for daily removal of fresh solids to the sludge-digestion tank. On the basis of the designed flow, the detention period in this tank is one and a half hours.

The sludge-digestion tank is circular, with a cone-shaped hopper bottom, and is equipped with a Downes floating cover. The outlet pipes for supernatant liquor and sludge circulation are provided at points just below the normal surface level in the tank and midway of the depth of the tank. The tank is designed for 3.75 cubic feet per capita. Gas is collected for heating the buildings. The aeration tank is 15 feet wide and 16 feet deep, with a circular bottom. The tank is divided into two sections, each of one-half the full plant capacity. Aeration is provided by brushes similar in appearance to street-cleaning rotary brooms. The bristles are of selected piassava weed. The direction of rotation of these brushes tends to throw the sewage across the surface to the opposite side of the tank. To assist in the rotation of the sewage, submerged paddles are installed in the tank which rotate in a direction that will promote the motion imparted by the brushes. The aeration tanks were designed for a total detention period of six hours. A 5-horsepower motor drives the brushes, and a 2-horsepower motor propels the paddles. The motive power is transferred from the motor to the drive shaft by means of reduction gearing and drive chains. Rheostats are installed for each motor, so that the speed may be varied at will. The rheostats permit the brushes to be driven at various speeds between 22 and 84 r.p.m., and the paddles at speeds between 3 and 7 r.p.m. Adjustable weirs are provided at the effluent end of the aeration tank, so that the depth to which the brushes dip in the sewage may be varied from 0 to 3 inches.

The final settling tank following the aeration tank is of the plain settling hopper-bottom type. The designed detention period is two hours. Sludge pipes lead from each of the four hoppers to a central well, from which sludge is removed by means of an air-lift pump to the sludge return channel. Gate valves are provided on each of these sludge pipes, so that the amount of sludge flowing from each of the sumps to the central well may be controlled and varied as desired. Activated sludge is returned to the influent end of the aeration unit through a sludge return channel. The return sludge is measured by a weir on the return sludge channel. Provision has also been made to waste excess activated sludge to the primary settling tank or direct to the sludge digestion tank. The sludge beds are designed on a basis of 1 square foot per capita.

Under the usual conditions of operation, the brushes in the aeration tank are run at a speed of 60 r.p.m. The depth of submergence of the brush bristles in the sewage under average flow conditions is approximately 1.25 inches. This condition of operating the brushes raises the sewage from the surface and throws it in a finely divided state a short distance across the surface toward the opposite side of the tank. The paddle wheels normally operate at 5 r.p.m. While the paddles were installed for the purpose of promoting the circulation of the tank contents, and to maintain sufficient circulation velocity in the tank to prevent settling of suspended solids, it has been found that the necessary velocity to prevent such deposition can be maintained by the brushes alone at normal operating speeds without the aid of paddles.

Analytical results show that a very good purification was obtained even with a short period of aeration. The comparison of two periods of high and low flow show that while the purification processes in the aeration tank were approximately the same for each period, during the high flow period the over-all plant efficiency was considerably reduced on account of insufficient settling capacity in the final settling tank.

—From the Journal Series of the New Jersey Agricultural Experiment Station, New Brunswick, N. J. By G. M. Ridenour and I. G. Lacy, Research Engineer and Assistant Chemist, Department of Sewage Research.

Disposal of Creamery Wastes

THE disposal of dairy wastes is one of the most difficult problems facing sewage treatment plant operators. Studies on the disposal of creamery waste reported by Professor Max Levine, Department of Sanitary and Technical Bacteriology, Bacteriologist Engineering Experiment Station, Iowa State College, Ames, Iowa, and presented at a meeting of the National Dairy Show, indicate:

1. Anaerobic devices, such as septic or Imhoff tanks, are not suitable for the treatment of creamery wastes because:

a. The milk sugar is rapidly decomposed with the production of acids which may curdle the waste. The curd may either precipitate or rise to the surface as a scum.

b. If the creamery waste is sufficiently concentrated, the resulting acidity will inhibit the protein-digesting bacteria and many of these proteolytic organisms will be killed. The tank thus becomes a sedimentation tank instead of a biological digestion tank. Curds have been observed which appeared to be practically unaltered after six to nine months in septic tanks.

c. The effluents from such anaerobic tanks, because of their high acidity and, in some instances, suspended curds, are in an undesirable state for most efficient treatment on sand beds or stone filters.

d. The high acidity and consequent relative sterility of the contents of anaerobic tanks receiving sugar wastes result in high relative stabilities of the effluents. These are, however, merely apparent and not true stabilities. They may account, however, for the former recommendations, by agricultural authorities, to employ large septic tanks of at least six-day capacities.

2. Creamery wastes can be rendered innocuous in their effect on municipal sewage disposal plants by being subjected to some form of aerobic treatment.

3. The activated-sludge process is effective for removing acid-forming materials from wastes, but the process is not considered suitable for the average creamery.

4. Trickling filters are particularly adapted to the biological oxidation of acid-forming constituents in creamery wastes.

5. Stable effluents have been obtained by filtration of 1 to 1.5 per cent skimmilk solutions through 6 feet of cinders at a rate of about 500,000 gallons per acre per day.

6. A short dosing cycle (about 5 to 7 minutes) should give much better results than the commonly employed 15- to 20-minute cycle, when employing coarse filling materials such as 2- to 3½-inch rock.

7. Filtration of creamery wastes through 4 feet of coarse cinders (¾ to 1¼ inches) or 6 feet of medium-size rock (1½ to 2½ inches) at 500,000 gallons per acre per day should produce effluents which will not become appreciably acid and which should therefore not interfere with septic action if admitted to a municipal sewage disposal plant.

8. In certain locations where the effluent runs into a small creek which enters a larger stream in the course of a mile or two, partial purification by filtration, supplemented by chlorination of the effluent, should be most feasible and economical.

9. Preliminary treatment to the extent of removal of grit and fat is essential to the successful operation of the trucking filter. Prolonged detention in preliminary treatment processes is detrimental.

Operating Floor Chicopee Filtration Plant

Members of the New England Water Works Association

You are cordially invited to inspect the new Filtration Plant at Chicopee, Massachusetts, which was designed by Morris Knowles, Inc., Pittsburg, Pa., and equipped with a NORWOOD filtration system.

This plant represents the most modern design for a municipal purification plant and delivers a very satisfactory water for domestic purposes.

Acquaint yourselves with the quality and efficiency of NORWOOD equipment.

NORWOOD ENGINEERING COMPANY

FLORENCE, MASS.

5,000,000 Gallon Filtration Plant Chicopee, Mass.

Who's Who in City & County Engineering

One of a Series of Portraits of Engineering Officials Which Has Appeared Monthly Since April, 1928

RAYMOND B. TRAVER
Supt. of Highways, Onondaga Co., Syracuse, N. Y.
(Appointed 1922)

WALTER S. WHEELER
City Engineer
Dover, N. H.
(Appointed 1925)

FRANK F. KORESKY
County Surveyor and Engineer
Clark Co., Arkadelphia, Ark.
(Appointed 1923)

W. O. WASHINGTON
County Engineer, Cameron Co.
Brownsville, Texas
(Appointed 1920)

WILLIAM J. DWYER
Supt. of Highways, Cortland Co.
Cortland, N. Y.
(Appointed 1921)

ORSON C. RICHARDS
Supt. of Highways, Washington Co., Hudson Falls, N. Y.
(Appointed 1909)

GEORGE A. POSEY
County Surveyor, Alameda Co.
Oakland, Calif.
(Appointed 1921)

BERNIS B. WEBER
City Engineer
Oil City, Pa.
(Appointed 1913)

R. H. CLINGER
County Engineer, Dallas Co.
Dallas, Texas
(Appointed 1925)

SQUIRE E. FITCH
Supt. of Highways, Chautauqua Co., Jamestown, N. Y.
(Appointed 1922)

HERBERT W. KUEFFNER
Director of Public Works
Durham, N. C.
(Appointed 1914)

FRANCIS L. BRANNEN
City Engineer
Berlin, N. H.
(Appointed 1925)

FREDERICK C. WILLIAMS
City Engineer
Pawtucket, R. I.
(Appointed 1928)

GEORGE W. KRIEGER, JR.
Supt. of Highways, Dutchess Co.
Poughkeepsie, N. Y.
(Appointed 1921)

Clinton, Iowa, Cleans Up with a "Pittsburgh-Des Moines" Incinerator

Thirty-eight years of municipal contracting experience guarantee community satisfaction with a "Pittsburgh-Des Moines" incinerator installation. Replace unsightly "sore spots" and infested dumps with a distinct community asset — a modern, well-built disposal plant.

There are 24 pages of interesting photographs and complete operating cost data in the "Pittsburgh-Des Moines" Incinerator Catalog. Write for it today.

HERE'S a scientific disposal plant completed and tested in June, 1931, and now in daily operation for the City of Clinton. It has two multiple-cell furnace units that can destroy 72 tons of garbage and rubbish every 24 hours. Note the dignified, yet practical design. The concrete ramps save time for unloading the city's collecting trucks and they afford quick access and exit to and from the charging floor.

There are no objectionable odors, fumes or smoke from the operation of a "Pittsburgh-Des Moines" plant. It is simple to operate—the "foolproof" furnace design permitting the employment of unskilled labor.

All of the refuse is burned as fuel to give low operating costs.

Pittsburgh-Des Moines Steel Company

Room 941, 270 Broadway, New York, N. Y. **3452 Neville Island, Pittsburgh, Pa.**

Des Moines **San Francisco** **Seattle** **Chicago** **Atlanta** **Dallas**

METHODS and COSTS of REFUSE COLLECTION and DISPOSAL

36,000 Square Feet of Park at Municipal Incinerator

BY utilizing waste materials and the labor of unemployed men it has been possible to reclaim a plot of land containing about 36,000 square feet adjoining the Providence, R. I., municipal incinerator and transform it into a small park reservation. Waste ashes and sand were used to fill deep holes in the land, which has a frontage of about 225 feet on Kinsley Avenue directly west of the incinerator, and to bring it to grade. Then top soil of good quality, obtained without cost from excavations at the Hope Reservoir, was applied. Within a few days, as soon as dry weather was assured, the plot was seeded down to grass.

As a border to the plot, old paving stones have been used as curbing. Along the brick walls of the incinerator truck garages, at the rear of the plot, pansies have been planted that were sent to the incinerator for destruction on Memorial Day by a store which had been unable to sell them. Along the front of the plot, in the form of a hedge, are planted slips of boxwood and other varieties of shrubs reclaimed from plants thrown away by stores and householders and sent to the incinerator for disposal. Rose bushes and all varieties of shrubs, and dahlia, canna and many other kinds of flower bulbs, received at the incinerator after being thrown away, have been salvaged and planted for the beautification of the area surrounding the plant.

Waste wood sent to the plant to be destroyed is being used in the construction of a fence to border the rear of the plot of land, which has been graded. The plot that was under consideration for a time as a possible site for an additional incinerator unit was part of the Southern New England Railways' right-of-way.

The banks of the canal directly in front of the incinerator, heretofore unsightly, have been seeded down with grass and shrubs planted along the guard-rail fence. Officials of manufacturing plants and business houses in the vicinity have complimented the city public works department upon the landscaping work about the incinerator plant.

IRVING STONE,
Superintendent, Incinerator Department,
Providence, R. I.

Dothan, Ala.

The city of Dothan, population 16,046, collects the garbage throughout the city, using two 1½-ton motor trucks, one with a 7 x 14-foot and the other with a 7 x 16-foot body. The garbage is disposed of on an open dump.—J. L. VAUGHN, Auditor-Treasurer.

Eufaula, Ala.

One small and one large wagon and one 1-ton Chevrolet truck and a trailer made from an automobile chassis are used by the city of Eufaula, population 5,208, in the collection of garbage, which is disposed of by burning in a ravine.—J. W. SPENCER, Superintendent of Water Works and Streets.

Tarrant City, Ala.

Two 1-ton motor trucks, one 1—1½-ton, and one 2-ton truck are used by Tarrant City, population 7,341, for the collection of garbage, which is disposed of on a dump.—WALLACE WELLS, City Clerk.

El Dorado, Ark.

Using two 2-ton motor trucks, a contractor paid by the individual householders collects all the garbage in El Dorado, population 16,421. The garbage is disposed of on a dump.—R. B. SMITH, Inspector.

Alameda, Calif.

An individual contractor paid by the householders collects the garbage in Alameda, population 35,033, using five 8-ton motor trucks. The garbage is disposed of by burial and covering.—T. CARPENTER, City Veterinarian and Food Inspector.

Brawley, Calif.

The city of Brawley, population 10,439, collects waste throughout the corporation, using one 2-ton motor truck for garbage and two 2-ton trucks for rubbish. The garbage is disposed of by feeding to hogs.—C. J. PARK, City Engineer.

Eureka, Calif.

A contractor collects all the garbage of Eureka, population 15,752, and disposes of it on a local dump. He is paid by those employing him, according to the scale of fees established by the city.—A. WALTER KILDALE, City Clerk.

Fresno, Calif.

In Fresno, population 52,513, a private collector paid by the householders collects the garbage, using nine 3½-ton White trucks and two 4-wheel trailers. About 72 per cent of the garbage is disposed of by incineration, 3 per cent by salvage, and 25 per cent on a local dump.—RALPH P. TOCCHINI, Superintendent of Garbage Disposal.

Hawthorne, Calif.

The individual householder in Hawthorne, population 6,596, pays a contractor for the collection and disposal of household garbage. The contractor uses a 2½-ton enclosed tank truck for this purpose and sells the garbage to a hog ranch.—S. V. FRASER, City Clerk.

Roseville, Calif.

A contractor paid by the individual householder collects the garbage in Roseville, population 6,425, using two 2-ton motor trucks. The garbage is disposed of by burning.—F. R. CHILTON, City Clerk.

San Diego, Calif.

The city of San Diego, population 149,995, collects all the garbage in the city, using ten 2½-ton motor trucks in which a level load is equivalent to 156 cubic feet. The garbage is disposed of by dumping into a hopper, from which it is sold to hog raisers.—W. M. CLARK, Department of Sanitation.

San Mateo, Calif.

The city of San Mateo, population 13,444, arranges for a single contractor who is paid by the individual householders to collect the garbage of the city. The contractor uses two motor trucks with 6 x 12 x 6-foot bodies. The garbage is disposed of by feeding to hogs.—E. P. WILSEY, City Manager.

Santa Rosa, Calif.

A private collector paid by the householders collects the garbage in Santa Rosa, population 10,636. The contractor uses four motor trucks, three of which are 5-ton units and one a 2½-ton truck. The garbage is disposed of by burning in the open.—E. J. HELGREN, Health Officer.

South Pasadena, Calif.

The city of South Pasadena, population 13,730, collects the garbage throughout the municipality, using one 5-ton White truck with removable tanks. A contractor takes the garbage from the city in the collection tanks and hauls it away on his own trucks.—FRANK H. CLOUGH, City Engineer.

Corona, Calif.

The city of Corona, population 7,018, collects the garbage, using one 2-ton Ford truck with a 3-yard body. The garbage is disposed of by feeding to hogs.—H. G. DANIELS, Superintendent of Streets.

Culver City, Calif.

The city of Culver, population 5,669, pays a contractor to collect the garbage. The contractor uses a 5-ton truck with waterproofed steel body and delivers the garbage to a hog ranch.—W. J. WALSH, Superintendent of Streets.

TEN SPRINKLERED PROPERTIES AT GARDNER, MASS. *protected by* GAMEWELL *SPRINKLER WATCHMEN*

Sprinklered properties are generally your largest taxpayers—the main support of your city and your fire department. A serious fire loss in any one of these properties not only throws other taxpayers out of work, but, more important to you, it causes a loss to the city in taxable revenue, and that means less money for fire department needs, firemen's salaries, etc.

Chief Robert M. Tappin of Gardner, Mass., has safeguarded against this by getting the sprinklered property owners to install Gamewell master fire alarm boxes—SPRINKLER WATCHMEN—connected to their sprinkler systems, making every sprinkler head a fire department nerve. You should do likewise in your own city.

CITY OF GARDNER
HEADQUARTERS FIRE DEPARTMENT
5 LAKE STREET

ROBERT M. TAPPIN
CHIEF

GARDNER MASS. July 21, 1932

The Gamewell Company
Newton, Mass.

Gentlemen:

Upon my recommendation three years ago, ten business concerns here in Gardner each installed a Gamewell master type municipal fire alarm box connected to its sprinkler system so as to send an alarm direct to our municipal fire department in the event a sprinkler head should open for a fire or accidentally.

These sprinkler alarm connections which you call the "Sprinkler Watchman", have been very satisfactory. On one occasion we received an alarm from the master fire alarm box at the Gardner News Building where there was a water flow, caused by a freeze-up in the sprinkler system. Another alarm was received from the "Sprinkler Watchman" at the Gardner Trust Building, which operated when excessive heat in the boiler room melted a sprinkler head. In both cases we responded immediately and kept the water loss down to a minimum.

Since the installations were made, we have not been obliged to make any repairs to the equipment, and other maintenance has amounted to almost nothing, beyond a periodic inspection such as we give to all of our regular municipal fire alarm boxes.

Not one false alarm has been received to date from any of these ten master boxes.

I am a strong advocate of a direct tie-in between private sprinkler systems and the municipal fire department thru the Gamewell master box. It gives us a chance to reach a fire before it gets too big to handle easily. And, it gives us a chance to cut down water damage too -- because a dollar lost from water damage is no different than one lost from fire. Fire chiefs in other cities will make no mistake in recommending this hook-up to the owners of sprinklered properties.

Having seen your recent advertising on the "Sprinkler Watchman", I thought you would be interested in our experience here.

Yours very truly,

Robert M. Tappin

CHIEF, FIRE DEPARTMENT

The Gardner Trust Co. (left) — protected by a Gamewell SPRINKLER WATCHMAN is typical of the buildings that should be so protected in every city.

THE GAMEWELL COMPANY
NEWTON, MASS.
"A Box a Block"

Police—Fire—Safety Items

of Interest to Departments of Public Safety

Police Training in New York State

A REPORT of the above title, recently issued by the New York State Conference of Mayors and Other Municipal Officials, gives the following information:

Fourteen zone police training schools were in operation in New York State during 1931-32. New York City has a school for its own department. The State Training School for Police is operated by the State Police for troopers and any other police officials who desire to attend. Twenty-three municipal training schools, of which twelve were in operation during the year, are under the supervision of an Advisory Council on Police Training, representing the New York State Conference of Mayors, the State Police Chiefs' Association and the State Police School. The economic depression materially cut down the number of municipalities operating their zone schools this year. The cost of operating the training school for instructors was shared by the Conference and the State Police School. The expenses of operating the zone schools were paid by the Conference and the municipalities having zone schools. The Conference share was made available through a grant from the Spelman Fund of New York.

The attendance at the zone instructors' school and the twelve municipal zone schools, exclusive of New York City, was 2,014. Certificates of attendance were presented to 1,972 policemen and 26 civilian candidates for police posts. This includes only a partial record of attendance at the Buffalo school. A total of 100 municipalities, the sheriff's office of three counties, the district attorney's office of one county, and a state hospital were represented at the municipal schools.

Asheville Police Department Extensively Modernized

A LARGE program of improvements in its police department has just been completed in Asheville, N. C. It includes changes in organization, the installation of a complete records and identification bureau, rearrangement in physical quarters, the establishment of a policewoman's unit, and the institution of training in the many branches of police science.

With the belief that the intelligent administration of a police department requires complete information with respect to crime conditions and to the effectiveness of the department in coping with them, one of the first moves in this police program was to establish a Bureau of Records and Identification—the hub around which nearly all police activity radiates. It maintains the complaint reports, arrest records, property-identification records, automobile theft reports, missing-person files, personnel records, accident reports, and general correspondence. The fingerprint, photograph, modus operandi, and other identification services are all a part of this bureau. All communication facilities are centralized here. All property taken from prisoners, or as evidence, or found is handled by the bureau.

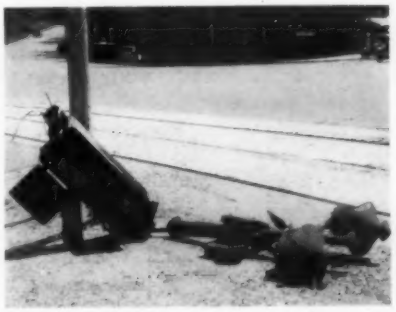
New record forms have been installed and detailed instructions prepared for all members of the force and records bureau employees explaining just how the new records and services are to be used. Copies of the instructions and forms can be obtained by writing Gerald Cowan, Director of Public Safety of Asheville, or the International City Managers' Association, 923 East 60th Street, Chicago, Ill., which assisted in supervising the changes and preparing a comprehensive plan for the department. Already these records have aided in subjecting police operations to more definite control and in providing the department with essential facts for distributing the force and for solving crimes. Moreover, a follow-up officer has been appointed, whose duty it is to see to it that all matters requiring police attention are disposed of correctly and with dispatch.

The police telephone system has been revised so that telephone calls are received at a complaint desk in the Records and Identification Bureau. From this point assignments are made to investigating officers, information is given, or the calls are relayed as occasion warrants.

Although the city is not financially able at the present time to install a radio system, it plans to do so in the near future. Orders and alarms will be broadcast to officers on duty from the central complaint desk, where all crimes are reported. Radio is particularly adaptable to cities such as Asheville, which has a very large area with residential sections extending miles into the hills.

Many other changes have been made with respect to such questions as the physical layout of the department, methods of investigating crimes, the distribution of patrol, and the assignment of duties, the installation of a police service rating system, the improvement of traffic control, and the establishment of a traffic-violation bureau.

Bad for Fire Alarms



A DEMOLISHED FIRE-ALARM BOX

A truck backed into this pedestal, knocking it over and severing the wires, throwing a number of other fire alarm boxes on the same circuit out of commission temporarily until repairs could be made. If all of the boxes on the circuit were of the proper type to guard against this contingency, only the box damaged would have been out of service

Lack of Adequate Fire Equipment—and a Holocaust

THE following news item about Cleveland, Ohio, from *The New York Times* for July 31, tells its own story. How many other cities today have the same lack, and face the possibility of a similar disaster?

"A 36-year-old water tower that failed to function on the night flames destroyed the Ellington Apartments here and killed twelve residents is Exhibit A before a committee of city officials and citizens which is struggling this summer with the problem of raising funds to improve the Cleveland Fire Department.

"The Ellington horror could not have been more timely in awakening this city to fire-fighting needs in which there has been slight public interest for several years. The requirements were set forth in a departmental report two years ago, and on the afternoon of June 6 Safety Director Frank J. Merrick received from Fire Chief James E. Granger—both Merrick and Granger are new in office—a fresh report that the demands of the firemen for adequate equipment were imperative. On the night of June 6, following an explosion, the cause of which will never be traced, the apartment building burst into flames, and the community was shocked into attention.

"The advisory committee has been told by Fire Department engineers that $212,000 of equipment must be obtained at once."

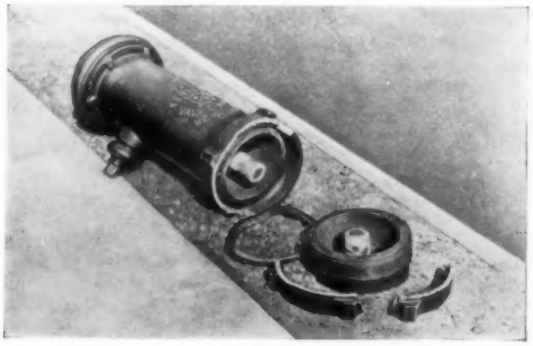
Fire Prevention Week

MATERIALS to assist in a vigorous observance of Fire Prevention Week, October 9-15, may be obtained from the National Fire Protection Association, 60 Batterymarch Street, Boston, Mass., at small cost. They include the Fire Prevention Week Handbook, with a new supplement entitled "Facts About Fire," posters, leaflets, and descriptions of window displays and other exhibits. The Association will furnish a list with prices.

1931 Fire Losses

THE latest estimate of fire losses in the United States, by the National Board of Fire Underwriters, $464,633,265, exceeds by approximately 3 per cent the Board's preliminary estimate, given at page 19 of THE AMERICAN CITY for June. It is 7.44 per cent below the 1930 figures—without correction for lower price levels and values prevailing in 1931, a condition that tends to make the fire losses appear smaller in proportion than is actually the case from a physical standpoint.

How you can save enough on each fire hydrant breakage repair *to pay for a new hydrant*



When a Kennedy SAFETOP Fire Hydrant is accidentally smashed by an automobile or truck, the inexpensive Safety Breakable Section breaks cleanly apart without any other damage to the hydrant. The standpipe, stem and operating mechanism are uninjured and the valve remains tightly sealed against flooding.

FIGURES obtained from representative large, medium-size and small municipalities all over the country indicate that the total cost of repairing a broken fire hydrant, including all the items, such as excavating and repaving, which should be considered, averages about $75.00 and in many localities reaches $100.00. This cost can be reduced to an insignificant amount, and striking aggregate savings can be made in your yearly fire hydrant repair expenses, by using

Kennedy SAFETOP Fire Hydrants

(Patented)

These hydrants are fully as strong as any other hydrant on the market, but if struck by a smashing impact, the damage is strictly localized to a patented safety breakable section. The broken parts can be replaced in less than 15 minutes, by one man, without excavating or shutting off the water service, and at a total cost of $10.00.

This means that, as compared to the cost of repairing fire hydrants now commonly used, **each SAFETOP repair will save enough to pay for a new hydrant.**

You can begin NOW to secure these important savings by replacing broken fire hydrants with Kennedy SAFETOPS, installing them at exposed locations, and standardizing on them for extensions to your present system.

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Municipal catalogs

THE AMERICAN CITY should always be mentioned when writing for this material which is furnished free.

Keep your files up to date by checking over these items each month and writing for those you need.

WATER SUPPLY IN EMERGENCY

939. A water supply becomes priceless when there is no power available to pump it. Examples of installation and the service of Sterling high-duty internal combustion engines from 12 to 565 brake horsepower, which are ready in an instant to furnish power when electricity is not available, are given in the literature of the Sterling Engine Co., Dept. C-11, 1270 Niagara St., Buffalo, N. Y.

A BOILER WATER TESTING OUTFIT

940. W. A. Taylor & Co., Inc., 872 Linden Ave., Baltimore, Md., will be pleased to send descriptions and illustrations of its two new outfits for controlling the pH and phosphate content of boiler water. The procedure is simple and easily learned, and only a few minutes are required to complete a test.

AUTOMATICALLY PRIMED PUMP

941. The Worthington Pump and Machinery Corp., Harrison, N. J., will be pleased to send complete information regarding its new self-contained automatically primed centrifugal pumping unit, in which the prime is promptly restored by an evacuator which is controlled by the pressure on the pump discharge.

A ROAD DISC FOR OIL ROAD MAINTENANCE

942. A maintainer and rebuilder of oiled roads, known as the Baker Model 80 road disc, has been announced by the Baker Mfg. Co., 585 Stanford Ave., Springfield, Ill. A complete description and illustration of this machine may be secured direct from the manufacturer.

CURING CONCRETE WITH SILICATE OF SODA

943. A 64-page technical publication replete with illustrations and the results of tests has been published by the Sodium Silicate Mfrs. Institute, on curing concrete with silicate of soda. Copies of this book at $1.50 each may be secured from J. P. Elkinton, Sodium Silicate Mfrs. Institute, 121 S. Third St., Philadelphia, Pa., and from The Grasselli Chemical Co., Inc., Cleveland, Ohio, Mechling Brothers Chemical Co., Camden, N. J., The Philadelphia Quartz Co., Philadelphia, Pa., and The Standard Silicate Co., Cincinnati, Ohio.

AN AUTOMATIC FIRE HERO

944. A fire-alarm device has been developed by the Western Electric Co., 50 Church St., New York, which gives a fire alarm without causing a disturbance in the assembled group. It consists of a special type of wiring which when overheated by the fire sends an alarm to fire headquarters, starts the music reproducer and, third, lights green arrows showing the correct route for exit. Complete information may be secured from Western Electric.

DEPENDABLE SEWERAGE LINES

945. Sewerage lines that must carry heavy loads 24 hours a day must be equipped with dependable pipe and fittings. Lynchburg cast iron pipe and fittings are dependable, backed by more than a half-century of specialized experience. Quick estimates on bell-and-spigot pipe and fittings from 4 to 54 inches, on cast iron flanged pipe from 3 to 84 inches, on cast iron flanged fittings and flanges from 1 to 84 inches, and on de Lavaud centrifugal cast iron pipe may be secured from the Lynchburg Foundry Co., Lynchburg, Va.

A NEW 40-HP CRAWLER TRACTOR

946. The International Harvester Co. of America, Inc., 606 S. Michigan Ave., Chicago, Ill., will be pleased to send complete information on the new Model T-40 6-cylinder TracTracTor, which develops a maximum drawbar horsepower of 40 and a maximum engine horsepower of 52 and is especially suited for heavy construction work.

A TIRE WITH NO AIR PRESSURE

947. The new Zero Pressure high-traction tire of The B. F. Goodrich Co., Akron, Ohio, has cushioning qualities equal to the pneumatic, has no air pressure, and provides a snowshoe effect in loose or soft soil, and no penetrating obstacle can damage it or cause delay. A complete description of the tire may be secured direct from The B. F. Goodrich Co., Akron, Ohio.

AN ELECTRICALLY OPERATED FLOW METER

948. Bulletin 261 which has recently been released by the Builders Iron Foundry, Providence, R. I., describes the operation and construction of the new Chronoflo meter, which has a wide measuring range, accuracy and abundance of power, and since it operates with a Telechron motor can deliver readings for very long distances with the same accuracy.

A SNOW BROOM AND STREET SWEEPER

949. Complete specifications, a description and illustration of the Detroit-Cletrac sweeper and snow broom manufactured by the Detroit Harvester Co., 5450 W. Jefferson Ave., Detroit, Mich., may be secured direct from the manufacturer by asking for Bulletin No. 1.

PRECAST EGG-SHAPED SEWERS

950. Egg-shaped sewer pipes can now be purchased in precast form, thus making available the self-cleansing facilities of this type of pipe for smaller sewers. Complete information may be secured from The Mueller Concrete Construction Corp., 6620 E. Canfield Ave., Detroit, Mich.

WATER-WASTE SURVEYS

951. The Pitometer Co., 50 Church St., New York, will be pleased to furnish complete information regarding its complete water-waste surveys, its trunk main surveys, water distribution studies and other services of value to the water-works man who wishes to operate his system economically.

FILTERING ONE BILLION GALLONS DAILY

952. This is the record of Roberts filters on municipal water-supply systems alone. Hundreds of industrial installations deliver almost an equal amount. The list of recirculation plant installations includes the most modern outdoor and indoor swimming pools. Complete information may be secured from the Roberts Filter Mfg. Co., 602 Columbia Ave., Darby, Pa.

DIESELS FOR MUNICIPAL POWER

953. The Nordberg Mfg. Co., Milwaukee, Wis., manufacturer of all sizes of diesel engines for municipal power plants, which has recently installed a 6-cylinder 1,000-kw diesel to replace five similar engines in the oldest municipal diesel plant, will be pleased to furnish complete information on the economical form of power to any municipal group interested.

ASPHALT HEATERS AND TOOL HEATERS

954. Hotstuf asphalt heaters, surface heaters, paving tool heaters and tools and Hi-Speed trailer tool-boxes are listed and described in the catalog and price list of the Mohawk Asphalt Heater Co., Schenectady, N. Y.

AN AUDIBLE AND VISIBLE FIRE BEACON

955. Complete information regarding the new type of Novalux fire beacon, which is designed for mounting outside fire houses or at street intersections and which gives both an audible and a visible signal, may be secured from the General Electric Co., Schenectady, N. Y.

A CULVERT THAT OUTLIVES THE ROAD

956. Facts about Gohi culverts, which are made of genuine open hearth iron and outlive nine out of ten roads, may be secured from the Gohi Culvert Mfrs., Inc., Newport, Ky.

A SAFE CONSTRUCTION SIGNAL

957. The Toledo torch, a bomb torch, which gives dependable and economical protection and will not blow out and rights itself if upset, is described in the literature of The Toledo Pressed Steel Co., Toledo, Ohio.

Return this coupon and you will receive the catalogs requested

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A SYSTEM OF REMOTE METERING AND RECORDING

958. The Telemco system of remote metering and recording of pressure and water levels, which has many distinctive features, such as a low voltage with current only in the receiving end, and simplicity of construction, is described in Bulletin No. 1017 issued by the Pittsburgh Equitable Meter Co., Pittsburgh, Pa.

BOOSTER HEATER FOR ASPHALT MATERIALS

959. Information regarding the Cleaver-Brooks pumping booster for raising the temperature of asphaltic material in a tank car, and also agitating the material in the car, may be secured direct from the Cleaver-Brooks Co., 740 N. Plankinton Ave., Milwaukee, Wis.

A THREE-UNIT BITUMINOUS PAVER AND FINISHER

960. The Barber-Greene Co., Aurora, Ill., has announced a three-unit bituminous paver and finisher replacing the two-unit machine announced some time ago. It now consists of a special loader, a mixer and a finisher, and is described in detail in literature which may be secured from the manufacturer.

A NEW WING STREET SIGN

961. The Municipal "Monarch," a wing street sign of distinctive design offered at a low price for use in both residential and business sections, is described and illustrated in colors in the most recent folder of the Municipal Street Sign Co., Inc., 299 Broadway, New York.

DUSTY ROADS ARE UNNECESSARY

962. There is no need for city and county highway engineers to have a continuous living nightmare of dust danger and high maintenance costs on gravel and earth roads. The latest literature of The Dow Chemical Co., Midland, Mich., tells how you can keep your community roads free from dust through the use of Dowflake calcium chloride.

WHAT TO DO IN CASE OF ACCIDENTAL DROWNING

963. Complete knowledge of the prone pressure method of resuscitation for those who are suffering from immersion should be possessed by every life-guard at swimming pools and bathing beaches. This method in conjunction with an H-H Inhalator, a complete description of which may be secured from the Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh, Pa., proves very efficient in bringing about prompt recovery.

A NEW TRACTOR FOR SEMI-TRAILERS

964. The White Company, Cleveland, Ohio, has announced a new super-heavy-duty tractor known as Model 691 for heavy-duty transport hauling. It is equipped with a 6-cylinder White 5-AD engine, has a wheelbase of 129.5 inches, and carries 10.5/24 balloon tires front and rear on cast steel wheels.

A RUST-RESISTING IRON PIPE

965. A worthwhile catalog published under the title, "Toncan Iron Pipe for Permanence, 2nd Edition," has recently been issued by the Republic Steel Corp., Youngstown, Ohio. It discusses the pipe problem, the development of Toncan iron and its advantages as a pipe material, particularly in uniform resistance to rust and corrosion, its welding properties, the manufacture of Toncan pipe, examples of its use, and tables of sizes and weights. This 64-page catalog will be sent to any municipal official or contractor interested in rust-resisting pipe.

A NEW POWER-CONTROLLED GRADER

966. Caterpillar Tractor Co., Peoria, Ill., has announced a new power-controlled Caterpillar Sixty grader in which seven levers control eighteen movements of the various parts of the grader. A single-cylinder air-cooled 5-horsepower engine mounted on the grader furnishes the power for operating the various movements. Details of performance and cost may be secured direct from the manufacturer.

ACCURATE VENTURI TYPE METERS

967. Simplex meters of the venturi type, which are accurate, reliable, simple, easy to check and adjust, are described in a bulletin of the Simplex Valve & Meter Co., 6743 Upland St., Philadelphia, Pa.

PERMANENT BRASS STREET SIGNS

968. Permanence is an inherent characteristic of brass street signs, which are non-corrosive. A list of brass street-sign installations that have stood the test of time, and a catalog, will be sent on request by the Union Iron Products Co., Dept. H, East Chicago, Ind.

ROSES, EVERGREENS AND OTHER NURSERY STOCK

969. Bobbink & Atkins, Rutherford, N. J., will be pleased to send its catalog of nursery products, including roses, evergreens, rhododendrons, trees and shrubs, old-fashioned flowers, fruit trees and bushes, to any municipal officials or civic organizations considering extensive planting as an aid to unemployment.

DEPENDABLE LAWN-MOWING EQUIPMENT

970. Information regarding the Coldwell L-Twin combined rolling and mowing unit, which develops a thick, heavy turf, free from dandelions and other lawn pests in city parks, is given in the literature of the Coldwell Lawn Mower Co., Newburgh, N. Y.

WATER CONTROL WITHOUT FLOATS OR FIXTURES

971. Golden-Anderson automatic cushioned controlling altitude valves, which operate either automatically by water, electrically, if desired, or automatically work both ways on a single line and maintain a constant water level in reservoirs, tanks and standpipes, are described in the literature of the Golden-Anderson Valve Specialty Co., 1329 Fulton Bldg., Pittsburgh, Pa.

WROUGHT IRON AND CHAIN LINK WIRE FENCES

972. Fence specifications and quotations on the most economical fences for different uses may be secured from the Stewart Iron Works Co., Inc., 813 Stewart Block, Cincinnati, Ohio.

TANKS THAT SAVE PUMPING COSTS

973. Chicago Bridge & Iron Works, 2127 Old Colony Bldg., Chicago, Ill., will be pleased to send literature to any water-works man interested in reducing his pumping costs easily by the construction of an elevated steel tank to balance the load on the distribution system.

CONCRETE WELLS FOR DROUGHT INSURANCE

974. Kelly Concrete Cased Wells, which deliver all the water that can flow through the surrounding ground strata, and deliver it sand-free and with capacities ranging as high as 6,000 gpm, are described in the literature of the Kelly Well Co., Grand Island, Nebr.

A LOW-HEAD AERATOR AND CHEMICAL MIXER

975. Aer-O-Mix, a combined low-head aerator and thorough chemical mixer for water treatment plants which has proved its effectiveness in its many installations, is described and depicted in the literature of Vogt Brothers Mfg. Co., Inc., Louisville, Ky.

SANDWICH TYPE EXPANSION JOINTS

976. The Carey Elastite expansion joint of the sandwich type, which protects concrete paving against expansion and contraction stresses and which has been proved by twenty years' use in highways and sidewalks, is described in the catalog and 1932 price list of The Philip Carey Co., Dept. E-1, Lockland, Cincinnati, Ohio.

STEEL FENCE POSTS

977. Steel fence posts rolled from the highest grade carbon steel, and easy to drive, self-contained and with a pleasing appearance and high safety factor, are described and illustrated in the catalog of Sweet's Steel Co., Williamsport, Pa.

CUT HYDRANT COLLISION COSTS

978. An 80 per cent saving in fire-hydrant collision repair costs, and the eliminating of flooding, excavating and interruption to water service, and every opportunity for speedy repairs, are made possible by the Kennedy Safe-top fire hydrant. Complete information regarding this may be secured from The Kennedy Valve Mfg. Co., Elmira, N. Y.

A NEW LINE OF ENGINES

979. Waukesha Motor Co., Waukesha, Wis., will be glad to send to those interested complete information in regard to the new Waukesha full-power engines, features of which are the Ricardo principle of combustion and the new metals developed for use in their manufacture, and which are now available in three sizes of sixes rated at 90, 110 and 125 horsepower.

CAST IRON PIPE

980. Quotations on cast iron pipe for water and gas, and also special castings and flange work, will be given promptly by the Donaldson Iron Co., Emaus, Lehigh County, Pa.

AMMONIA AND LIQUID CHLORINE

981. Ammonia, the reagent which makes liquid chlorine more effective and which aids in reducing tastes and odors from water, is one of the leading products of The Mathieson Alkali Works (Inc.) 250 Park Ave., New York. Quotations on Mathieson anhydrous ammonia and Mathieson liquid chlorine will be furnished promptly upon request.

SAMPLE WATER PIPE JOINTS

982. Any water works may now have a few sample joints made with Hydro-Tite, which forms a strong, tight, flexible joint without calking. By writing to the Hydraulic Development Corp., 50 Church St., New York, municipal officials may make arrangements for a representative to make several cast iron bell-and-spigot water pipe joints on the job for samples and testing.

A STREET LIGHT, OR A POLICEMAN?

983. Which is cheaper, a policeman every 50 yards, or a street light? Efficient modern street lights are like auxiliary policemen. Their revealing glow drives law-breakers away. Assistance in choosing proper standards, and in proper spacing and heights of street lights, may be secured from Graybar Electric Co., Graybar Bldg., New York.

TANKS AND TOWERS TO MEET ALL REQUIREMENTS

984. Tanks and towers for water works have been developed to a high state of effectiveness and are designed to give uninterrupted service. The R. D. Cole Mfg. Co., Newnan, Ga., will be pleased to furnish a list of Cole tanks which have been erected in practically every section of the country for municipal and other plants.

REINFORCED CONCRETE PIPE

985. Lock Joint reinforced concrete pipe, which is made on the job for each installation, thus insuring the use of local labor and materials, and which is adaptable for pressure, water pipe, sewers and culvert installations, is described completely with illustrations of outstanding installations in the literature of the Lock-Joint Pipe Co., Ampere, N. J.

WORN-OUT ROADS MADE SMOOTH RIDING

986. The use of Tarvia "Re-Tread" for taking the bumps out of worn-out roads and turning them into smooth, easy-riding, skid-safe highways, is told in the literature of The Barrett Co., 40 Rector St., New York.

VALVES AND HYDRANTS

987. The best for the money and all that money can buy in dependability and service is built into Rensselaer valves and Corey hydrants, which are described, with accessories, in the catalog of the Rensselaer Valve Co., Troy, N. Y.

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The American City

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New York

35 Cents, $2 a Year

Babson Reservoir—Built in Six Months

By E. B. MYOTT

Fay, Spofford & Thorndike,
Consulting Engineers,
Boston, Mass.

THE city of Gloucester, Mass., at the beginning of the second year of the 1929-1930 dry period, was confronted with the problem of reducing its water consumption to a minimum and immediately providing itself with an additional water supply. The average daily water consumption of the city had exceeded the safe yield of the three reservoirs supplying the city since 1917.

Although the need of a new supply had been realized for several years, its development had been postponed for the sake of economy. The reservoirs supplying the city were nearly full, following the spring rains of 1929, but 75 per cent of all water stored in the reservoirs was consumed before the reservoirs began to fill again in November. The recovery of the storage in the reservoirs during the following winter was only partial, and following the spring rains of 1930 the reservoirs were only half-full.

It was apparent at that time that unless a large reduction was made in the rate of water consumption, or unless unusually heavy rainfall occurred during the summer months, the existing water supplies would become exhausted. The Water Commissioners at the beginning of the 1930 summer season forbade the use of water for lawn sprinkling or other outside use. This action, although severely criticized, was justifiable according to records. The restriction on the use of water resulted in a 20 per cent reduction in the amount of water normally required for the entire year. Even with this reduction in consumption, there was only a sufficient amount of water in the reservoirs to serve the city about one month when the supplies were replenished partially by rainfall, which occurred near the end of the year.

Preliminary Engineering Investigations

In the early part of 1930, preliminary engineering investigations were started to determine the most practicable method of developing an additional supply. The city had contemplated for many years that Chebacco Lake in the town of Essex would be used sooner or later to augment the existing supplies, and had obtained legislative authority to take water from this lake. The lake is about seven miles from the center of the city. The elevation of the lake is low, and it would be necessary to pump all water to be used. Since the granting of authority many sum-

Photograph by Aero-Scenic Airviews Co., Boston

AIR VIEW OF BABSON RESERVOIR AND DAM, GLOUCESTER, MASS.

A VIEW ACROSS THE DAM
Showing the pumping station, spillway, elevated tank and gate house

mer camps had been built along the shores of the lake. It was considered that it would be necessary to treat the water because of the possibility of pollution from the large population residing on the watershed and because of tastes and odors which would prevail, since the lake is very shallow. The total cost of acquiring water from this source would be high.

All other possible sources of supply in the town of Essex and in the city of Gloucester, including underground sources, were investigated, and only one was found to be worth serious consideration, namely, Alewife Brook, in the central portion of Cape Ann, with a satisfactory reservoir site only about one mile from the center of the city. This brook, with an undeveloped watershed of about 1¾ square miles and capable of being developed to meet all anticipated future requirements of the city for a period of a quarter of a century if used in conjunction with existing supplies, had been ignored for years as a potential water supply.

After the Alewife Brook source was recommended for development, an old report of the first committee appointed by the city to consider the advisability of Gloucester's installing a water supply system, dated September 2, 1330, was found. This committee, with the assistance of Phineas Ball, a noted water-supply engineer practising in New England at that time, had studied carefully Alewife Brook and other possible sources of supply. Mr. Ball had planned a dam and reservoir on Alewife Brook in the same location and of about the same size as that described herein. The city, however, did not at that time install a water-supply system, but granted a charter to a private company, which developed other sources of supply. The privately owned system was acquired eventually by the city, and the supplies developed by the water company were augmented later by the construction of another reservoir. Since then the plans made by Phineas Ball for a reservoir on Alewife Brook had been forgotten. It was interesting to compare results of Mr. Ball's studies with the present-day studies on this project and to carry his original ideas through to completion.

The present Board of Water Commisisoners, after due consideration of the engineers' reports, including that of Phineas Ball, decided to proceed at once with the construction of a reservoir on Alewife Brook, and to complete the construction at the earliest possible moment, expecting the new supply would be needed as soon as it could be built.

The engineering and construction work was carried on as rapidly as the work would permit. The preparation of final engineering designs and details involved more work than the ordinary small reservoir job because of the appurtenant structures of the project, which included an automatic electric pumping station, an elevated tank, and considerable work along a railroad adjacent to the reservoir.

The first preliminary engineering report on this project was submitted to the Water Commissioners March 18, 1930, and the entire project was completed by the end of the year. The rapid progress made throughout all stages of the work is shown by the following chronological table and was gratifying to everyone connected with the project:

CHRONOLOGICAL TABLE OF PROGRESS

Preliminary engineering report, recommending construction of project, submitted to Water Commissioners	March 18, 1930
Final engineering designs started	May 17, 1930
Final engineering designs finished	June 15, 1930
Advertised for bids	June 16, 1930
Bids received	June 28, 1930
Construction contract awarded	July 1, 1930
Construction started	July 6, 1930
Started storing water	Dec. 9, 1930
Construction completed	Dec. 31, 1930
Reservoir filled	March 7, 1931

Excellent weather prevailed throughout the construction period, which assisted the contractor materially in the progress of construction, but the contractor's success in completing the work during the short period of time specified was due largely to supervision given the work and to the efficiency and amount of equipment on the project. The original cost of all equipment used amounted to about $100,000, a large amount for the size of the project.

Water Consumption Requirements

There has been no material increase in the year-round population of Gloucester for several decades; in 1930 it was 24,204. The city, however, has many summer residents, and its growing popularity as a summer resort has resulted in an increasing combined year-round and summer population, amounting to approximately 40,000 people at the present time.

The normal average daily water consumption throughout the year has been approximately as follows: 1.0 mgd in 1900; 1.3 mgd in 1910; 1.6 mgd in 1920; and about 1.9 mgd in 1930. It is believed that this increase will continue, so that in 1950 the average daily water consumption will be about 2.5 mgd.

The existing sources of supply, consisting of three surface reservoirs, have a safe yield of about 1.5 mgd. The

new reservoir will yield safely 1.0 mgd, increasing the total safe yield of all sources to 2.5 mgd, the estimated requirement for the year 1950.

Main Features of Project

Watershed.—Alewife Brook at the site of the dam has a watershed area of about 1.75 square miles, exclusive of about 0.55 of a square mile tributary to Cape Pond, the source of the brook. Cape Pond is used as a water supply by the town of Rockport. The watershed consists largely of undeveloped land and a small amount of farm land. A large part is forested with small growth and a few large trees. Although the watershed is traversed by the Boston and Maine Railroad and a state highway, there are only seven houses within its limits, and these are in a remote location from the reservoir. With the exception of the small building lots occupied by these houses, all land of the watershed has been acquired by the city.

Many acres of the watershed were owned by Roger W. Babson, nationally known statistician, whose ancestors were early settlers of Gloucester. The original dwelling of the Babson family is located on the state highway in the watershed; it is now used as a museum. Mr. Babson has maintained a bird sanctuary within the limits of the watershed for a number of years. It was the vision of Mr. Babson's father and grandfather that the land owned by them should be conserved for the uses of the city and as an inspiration to all lovers of God and nature. When it was found necessary for the city to acquire Mr. Babson's land for this water supply, he gave generously all land which he owned in Gloucester, in memory of his father and grandfather. It was quite appropriate, therefore, that the reservoir should be named in honor of these men and the entire watershed dedicated as a bird sanctuary.

Reservoir.—The reservoir is about one mile long and has a surface area of about forty acres. It has a capacity of about 200 million gallons, of which 178 million gallons are usable. It is estimated that the reservoir will yield safely (that is, will furnish during extremely dry periods) one million gallons per day.

The reservoir is adjacent to the railroad, and this made necessary the protection of the railroad fills by heavy stone riprap. The possibility of pollution of the reservoir by the use of toilets in the trains passing through the watershed was given serious consideration. Although it was expected that the toilet doors in the trains would be locked, as they are, while the trains traveled through the watershed, it was decided as a precautionary measure to filter all surface drainage from the track area adjacent to the reservoir. The drainage is collected in paved gutters along both sides of the track and is carried to six filter beds built at convenient low points, the location of them being determined by the profile of the railroad and the topography of adjacent land. The filter beds consist of 3 to 4 feet of sand of the same characteristics as that used for fine aggregate in concrete. The sites for the beds were cleared, grubbed and roughly leveled. No underdrains were used in the construction of the beds. The capacity of the beds provides for a rate of run-off, as computed by the rational method, using a rainfall intensity curve of 10-year frequency. The area of the beds was computed for a filtration rate of 10 million gallons per acre per day.

The entire area occupied by the reservoir was cleared, grubbed and stripped of top soil and all organic matter. The reservoir bottom is ideal, consisting of sand, gravel and many very large boulders.

Dam.—The dam is an earth structure with a reinforced concrete core wall and steel sheet pile cut-off about 600 feet long at the crest, with a maximum height of about 35 feet. It is 16 feet wide at the top, with a downstream slope of 2 to 1, and upstream slopes of 2½ to 1 and 2¾ to 1.

The material overlying bedrock at the site of the dam consisted of top soil, a thin stratum of silt and fine sand, and a stratum of medium-hard blue clay about 35 feet thick. The structure is keyed to the hard clay by the use of steel sheet piling, and all foundations of walls and structures were built on the clay.

The earth embankment was built of a mixture of top soil, silt, sand and gravel excavated from the site of the reservoir. It was built in layers about 6 inches thick and was thoroughly compacted by a roller and by tractors and steel wagons used to haul the material to the dam.

Underdrains were built at the original ground level under the embankment on the downstream side of the core wall to carry any leakage which might occur through the core wall, thus eliminating the possibility of the embankment's becoming saturated and possibly sloughing at the downstream face. Small stones and gravel were placed against the downstream face of the core wall connecting to the underdrains as a part of the drainage system.

The reinforced concrete core wall is 15 inches thick, with a footing 2 feet thick and 4 feet wide resting upon the clay. Steel sheet piling 12 feet long was driven into the clay for a water cut-off; the piling extends one foot into the footing of the core wall. The core wall is actually a diaphragm and requires the support of the embankment material on both sides of it for stability. The thickness of 15 inches was adopted more or less arbitrarily as a minimum thickness for building a suitable wall practically watertight of this character, using proper concrete aggregate for strength and obtaining sufficient cover of the steel. Steel plates ¼-inch thick and 6 inches wide were used as water cut-offs in horizontal construction joints. Vertical construction joints were built as expan-

INTERIOR OF THE PUMPING STATION

sion joints. The vertical joints were keyed and were painted with a heavy asphalt paint before pouring concrete for the adjoining section. Folded copper strips, No. 14 B. & S. gage, 18 inches wide, with premolded asphalt in the fold, were used as water cut-offs in the expansion joints. Observation of the action of these joints during construction indicates that this type of joint is quite suitable for this purpose. It is probably true that more movement occurred in the wall during the construction period than has occurred since the completion of the structure. A lighter weight copper might be used for this purpose with satisfactory results and would simplify the construction of joints considerably. Reinforced concrete walls of the same type of construction as the core wall were built on each side of the spillway.

The embankment between the spillway walls consists of large stone with the interstices filled with small stone. Thin grout was poured into the interstices of the upper part of the stone embankment, which cemented the stone together for a depth of about 5 feet. Reinforced concrete paving was laid on the embankment and was doweled and keyed to the grouted mat of stone embankment.

The spillway is 40 feet wide and of a capacity sufficient to carry flood flows from storms of great intensity. It was estimated that the maximum flood flow from the watershed, including the area tributary to Cape Pond, would be about 800 cubic feet per second, which is about 350 cubic feet per second per square mile. This flow would mean a depth over the spillway of about 3.25 feet. The dam was designed, however, with a freeboard of 6 feet to provide against damage from high wave action.

The flow of the brook was carried during construction through a 36-inch cast iron pipe encased in concrete laid underneath the spillway. This pipe was closed when the dam was nearly completed by a cast iron plug at the upper end and by concrete placed in a reinforced concrete manhole built especially for the purpose and as a part of the core wall.

The upstream face of the dam is protected by rough stone embankment on the lower half and concrete paving above. Most of the stone used for the embankment was found in excavating material for the earth embankment.

The concrete paving is 6 inches thick and was laid in blocks about 12 feet square resting on a bed of gravel 12 inches thick. Small footings 6 inches thick and 18 inches wide were built under all joints. Premolded asphalt was used in all joints. Although this paving was poured immediately after completion of the earth embankment before any settlement could occur, it is in remarkably good condition, only two slabs having settled noticeably.

The downstream slope of the dam has been planted with small pine trees spaced about 12 feet in both directions and with honeysuckle vines spaced about 3 feet in both directions. This planting is a part of a general scheme of landscaping the area below the dam, which has been laid out by Mary P. Cunningham, landscape architect, of Boston.

Gate House.—The gate house is 14 feet 6 inches wide by 20 feet 6 inches long, built of reinforced concrete to the level of the top of the dam, with a superstructure of Rockport granite above this level. There are three inlets from the reservoir at depths below full reservoir level of 6 feet, 13 feet and 20 feet. Water from the reservoir enters the gate house through trash racks installed on the outside of the structure. The trash racks are built of ⅜-inch by 3-inch bars spaced 4 inches center to center. The water is passed through a set of three copper screens in the gate house, the first consisting of ½-inch mesh with No. 14 B.W.G. wire, the second ¼-inch mesh with No. 14 wire, and the third ⅛-inch mesh with No. 16 wire. Screen frames are built of structural steel and timber. Screen guides are also built of structural steel and are arranged so that they can be replaced easily when it becomes necessary. The velocity of flow through the gross screen area for the maximum operating rate of 3,000 gallons per minute is about 0.3-foot per second.

Water is carried from the gate house to the pumping station in a cast iron pipe encased in concrete under the center of the dam.

All gates for operation of the water inlets, and the gate on the supply main, are operated from the main floor. The building is equipped with a float gage which indicates the reservoir level. Provision was made in the layout of the building for hoisting the screens to the main floor for cleaning.

Pumping Station.—The pumping station structure is built of Rockport granite, with a reinforced concrete substructure. The pump room is 18 feet wide by 28 feet long inside. A small room housing electrical control apparatus, an office and work room, a toilet room, and a stairway to the basement, occupy an additional inside area about 16 feet wide by 20 feet long. There is a basement underneath the entire structure.

There are two horizontal single-stage, centrifugal pumps designed to discharge 1,500 gallons per minute against a net operating head of 140 feet. The pumps are operated by direct-connected 75-hp, 1,800-rpm, 4,000-volt, wound rotor motors. The motors are automatically controlled by pressure regulators at the base of the elevated tank.

The 4,000-volt current is transformed inside the station to 110/220 volts for control apparatus, lighting and other miscellaneous use.

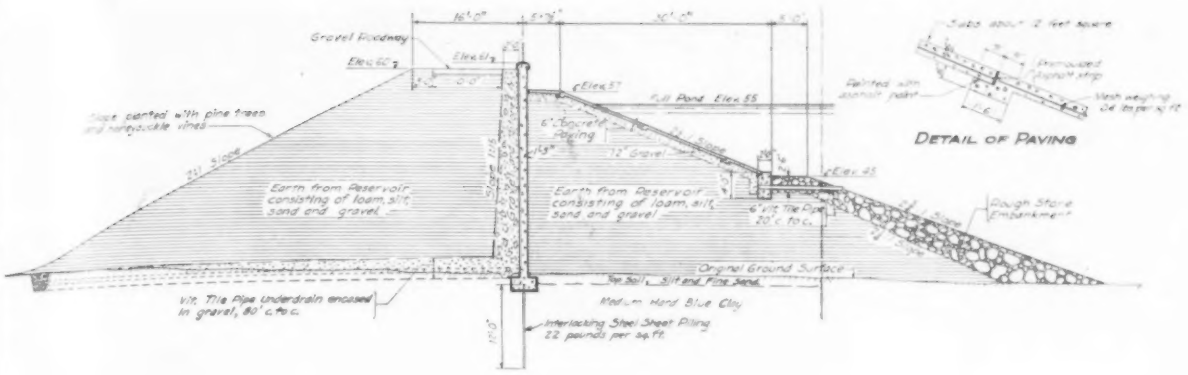
The electrical control apparatus for the motors consists of an indicating voltmeter, main control oil switches, magnet switches with definite time delay for automatic acceleration of the motors, knife switches for transferring automatic control to hand control and for transferring control from one motor to the other, and recording ammeters. Pressure gages are provided for indicating both discharge and suction pressures. The amount of water pumped is measured by a venturi meter with complete indicating and recording equipment. All control equipment is mounted on one switchboard.

All suction and discharge pipes are in the basement. Gates are operated by extension stems in the pump room. There is a gate and check valve on the discharge main of each pump and a gate on each suction main.

Elevated Tank and Distribution Mains.—Water is pumped directly into the distribution system, overflowing to an elevated tank built on high land at one end of the dam. The tank has a capacity of 250,000 gallons. A 16-inch supply main extends from the dam to the center of the distribution system in the city.

The capacity of the elevated tank and pumping equipment was determined largely by the required fire demand of the city and the inability of the existing facilities to meet that demand.

One big feature of the new water supply is its location with reference to the distribution system. Cape Ann, upon which Gloucester is situated, is actually an island,


Gravel Roadway
Elev. 66.7
Elev. 61.2
Slope planted with pine trees and honeysuckle vines
2½:1 slope
Earth from Reservoir consisting of loam, silt, sand and gravel
Earth from Reservoir consisting of loam, silt, sand and gravel
Elev. 57
Full Pond Elev. 55
6" Gravel Piling
12" Gravel
Elev. 45
6" V.T. Tile Pipe 20' c. to c.
Rough Stone Embankment
Original Ground Surface
Top Soil, Silt and Fine Sand
Medium Hard Blue Clay
Vit. Tile Pipe Underdrain encased in gravel, 80' c. to c.
Interlocking Steel Sheet Piling 22 pounds per sq. ft.
DETAIL OF PAVING
Painted with asphalt paint
Wash weighing 24 lbs per sq. ft.

Typical Section of Dam

cut off from the mainland by the Annisquam River and Canal. There is only one approach by vehicle to the city across the river. Water from the other supplies serving the city is pumped to a distributing reservoir having a usable capacity of only two million gallons. The city is served from this reservoir by two parallel supply mains which cross the Annisquam River in a tunnel. The new water supply, being located on the Cape, supplies the city from the opposite side of the canal, thus increasing materially the reliability of the city's water-supply facilities. During the season that the new reservoir was under construction a break occurred in one of the parallel mains supplying the city, and as a consequence the city's water supply was cut off for several hours.

Cost of Construction

The total cost of the project, exclusive of engineering, legal expenses and land damages, was $306,600. Nearly 80 per cent of the work was done under contract, the remainder being done by city forces and the Boston & Maine Railroad. Nine bids were received for the contract work. The contract was awarded to the low bidder, whose bid was 25 per cent below the average of all bids. The construction costs of the various parts of the project are given in the following table:

CONSTRUCTION COST

Outlet conduit and stream control	$17,000
Dam	83,100
Reservoir	30,900
Gate house	14,000
Pumping station	32,745
Elevated tank	22,000
Supply mains to distribution system	61,270
Miscellaneous piping at dam	10,000
Planting, roads, and grading below dam	9,750
Filter beds, paved gutters along railroad and railroad culvert	25,835
	$306,600

Organization

The construction of the reservoir was carried on under the direction of the Board of Water Commissioners, consisting of Albert P. Hubbard, Chairman, William Moor and Jeremiah Foster. The dam and reservoir were built by the C. and R. Construction Co., of Boston, under the superintendence of A. Martinello. The supply main from the reservoir to the city was built by the Water Department under the direction of John W. Moran, Superintendent. The work along the railroad was built by the Boston & Maine Railroad. The engineers for the design and construction were Fay, Spofford and Thorndike, of Boston, Mass., with the author in charge.

"Two Months Work for Nothing"

To the Editor of THE AMERICAN CITY:

Your sound comment on budget balancing and self-liquidating public works should receive wide publicity. The fact that we are in the midst of a national emergency of a most serious nature, similar to a war emergency, seems to be very little recognized. Were sound national, state and municipal planning up to date, we could now be doing many needed things to advantage, and getting much for our money, instead of putting out vast sums simply to keep people from starving and getting nothing of permanent value.

Here is an example of the lack of thinking which is characteristic of much of the talk of the present time. This is from an editorial in a Massachusetts weekly paper:

TWO MONTHS WORK FOR NOTHING

How would the average citizen like to work 61 days without any pay whatever?

The answer is that he wouldn't like it at all. But that, in effect, is what he is doing. Sixty-one days' work out of each year is required to pay the cost of government. In 1924 it was 46 days, and in 1913 about 25 days.

For what is government money spent? For schools, which are "nothing"; for streets, parks, playgrounds, which are "nothing"; for police and fire protection, which are "nothing." There are many other things covered in the cost of government, but, according to this writer, they are "nothing."

There are governmental expenses which could be entirely wiped out without doing harm. But schools, streets, sewers, etc., are not in the list. The prime point of attack on governmental expenses should lie in getting a dollar's worth of results for each dollar spent. But this is difficult, for it requires sound thinking, which is too much trouble; and to carry it out would require splitting tickets at elections, which is contrary to the common brand of party patriotism.

As a result of politics and graft, our tax dollar produces too little in many directions. We spend money for perfectly proper purposes, but get an inadequate return. This is true in other directions, but it is specially true in regard to the money spent to enforce our regulatory laws. This applies not only to the Volstead Act, but to zoning laws, smoke laws and practically all laws intended for the public welfare.

Here is where we should be applying our attention. It is time to do a little thinking and acting, and less of talking without thinking.

EDWARD T. HARTMAN.

Boston, Mass., August 3, 1932.

Collection Costs in Utica Reduced by Special Equipment

ONE OF THE NEW GARBAGE COLLECTION TRUCKS IN USE IN UTICA

By C. A. McKERNAN

Commissioner of Public Works, Utica, N. Y.

UTICA, N. Y., has a population of 105,000 and an area of 17 square miles. Collections of garbage are made in the residential districts twice weekly and in the business districts once a week. The total yearly collection approximates 14,000 tons. All garbage is taken from the rear of homes and buildings, the collectors using galvanized iron baskets holding 1½ bushels, into which are dumped the contents of the householders' containers. The collector continues with his iron basket until it is filled, and then it is dumped into the truck.

Before May 1, 1932, collections were made with teams and open trailers, which were covered with tarpaulin when loaded. Each team hauled out one empty trailer when starting in the morning; additional trailers were hauled out later by trucks, the teams continuing collection until the routes were finished. The loaded trailers were picked up by trucks at various locations where they were left by the teams, and were hauled to the incinerator in trains of two or three. Each team was manned by a driver and two collectors. A light truck with a driver and one additional man was used for collecting in the outskirts. Altogether twelve two-horse teams, five trucks and twenty-seven trailers were used in the work.

On May 1, five Collecto bodies of 10 yards capacity each were placed in service and the use of all other equipment discontinued, with the exception of an open truck collecting on the outskirts of the city. The work of the former equipment comprising forty-four collecting units is now being done with six trucks. Each of the trucks with a Collecto body is manned by a driver and four collectors. The loads average 5,600 pounds, and the average mileage per day per truck is 25.5 miles. The average haul to the incinerator is 2½ miles, for the loaded trucks. Each truck makes three loads on certain days and two loads on other days. The following table shows the comparison of costs between the two collection systems as operated in Utica:

OLD SYSTEM	
Yearly cost, wages	$96,508.12
Yearly, cost, supervision	3,400.00
	$99,908.12
Daily cost, labor and supervision	319.00
Cost per ton	7.13
Yearly cost, labor, supervision, supplies, etc.	116,598.12
Daily cost	372.52
Cost per ton	8.33
NEW SYSTEM	
Yearly cost, wages	59,470.00
Yearly cost, supervision	3,400.00
	$62,870.00
Daily cost, labor and supervision	201.00
Cost per ton	4.49
Yearly cost, labor, supervision, supplies, etc.	69,480.00
Daily cost	222.00
Cost per ton	4.96

Under the new system the services of barn-men, hostlers, trailer-men, trailer-repair-men and some collectors were dispensed with. In the supply account, items for food, forage, shoeing, tarpaulins, horse blankets, horse covers, harness repairs and replacement of trailer tires were eliminated. The above figures do not include any cost of gas, oil, depreciation, interest or garage rental. They do, however, include the cost of replacement of tires, parts, tools, etc., as well as light, water, stationery, fuel and insurance.

Effect of Wrapping on Collection

In Utica an ordinance requires that all garbage be wrapped in paper by the householders. The practice of placing all combustible rubbish with the garbage is encouraged, for the purpose of furnishing fuel for incineration. This practice makes for bulk rather than weight, with the result that the loads average only 560 pounds to the yard as against 1,000 to 1,400 pounds when the garbage is collected unwrapped and without rubbish. As this rubbish and paper would have to be collected and disposed of in any event, no extra cost to the city is involved by reason of its being collected with the garbage. It does, however, make the collection cost of the latter high and reduces the cost of ash and rubbish collection accordingly. The wage scale is $5 per day for chauffeurs and $4 per day for other labor.

1,600-Hp. Diesel Engine Carries Peak Load at South Norwalk Electric Works

By WILLIAM W. GAYLORD

Mechanical Engineer, Westcott & Mapes, Inc., Engineers and Architects, New Haven, Conn.

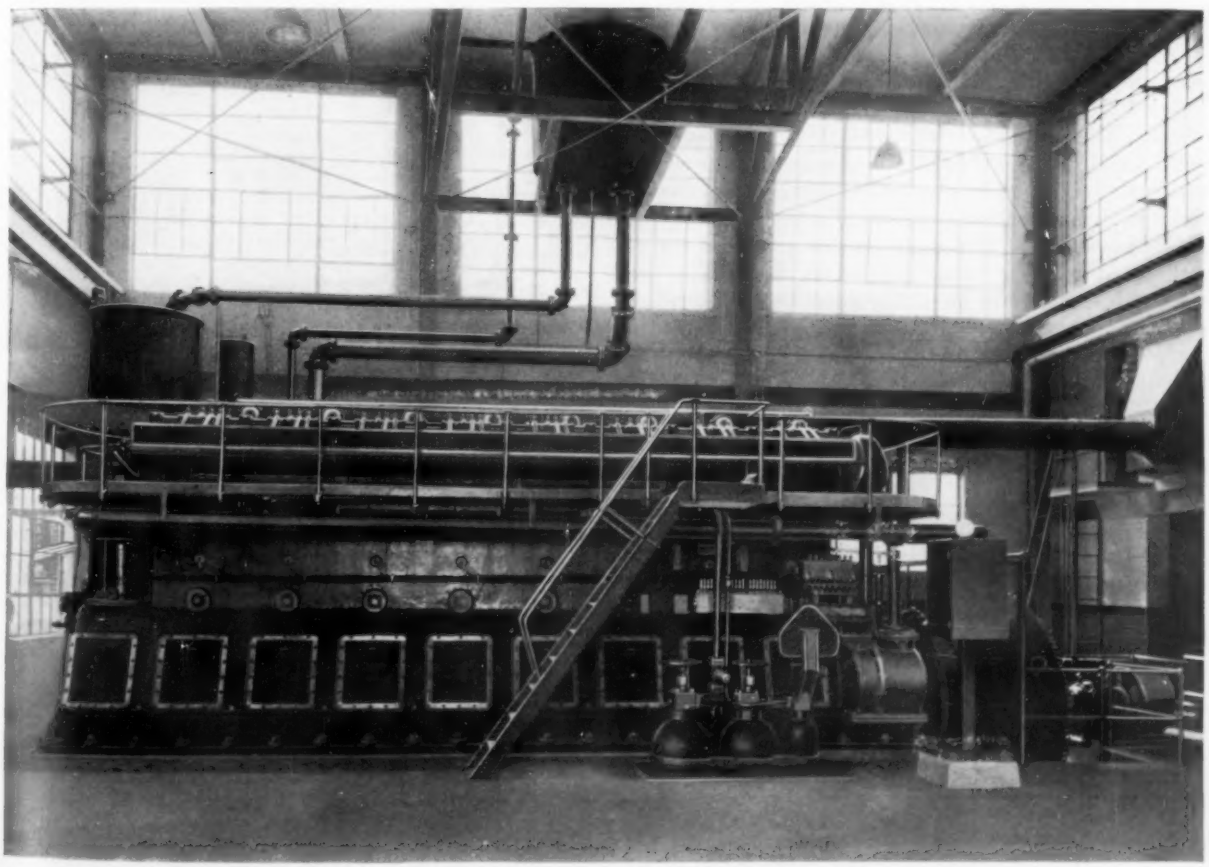
THE South Norwalk Electric Works is a municipally owned and operated utility, started by the city of South Norwalk in 1898 to supply light and power throughout the city. The city of South Norwalk has now become the Second Taxing District of the city of Norwalk, and the latter still operates this plant. The first equipment, installed in 1898, consisted of two 60-kw. steam-engine-driven generators with necessary boilers. Additional steam engines and generators were installed in 1900 and 1903.

An Early Diesel Installation

In 1905 a 160-kw. diesel-engine-driven generator was installed, which was probably the second such installation in the United States. Additional units of the same capacity were added in 1907 and 1910. The original system was designed for 220 volts d.c., as the area covered was limited to about 1¼ square miles. The capacity of this station had been outgrown in 1917, and as purchased power had by then become available, a rotary converter set of 300-kw. capacity was installed—and the additional electric power required was purchased. An investigation at this time had shown that the purchase of power would be more economical than the installation of a waterside steam generating station.

Additional rotary converter sets were installed in 1921 (two 330-kw.) and 1923 (one 550-kw.) and the purchase of power continued, running the diesel engines only at periods of peak load.

In 1928 the power requirements of the station were again studied as additional capacity was needed, and it was found that the load had grown to such an extent and become of such a character that the installation of a diesel- engine-driven generator of about 1,000-kw. capacity could advantageously be made to carry the peak loads so that purchased power could be taken at a high load factor and the demand charges thereby reduced. While this did not greatly reduce the total cost of power where fixed charges were figured, it provided a source of supply inde-



1,600-HP. McINTOSH & SEYMOUR DIESEL ENGINE DRIVING 1,110-KW. GENERAL ELECTRIC GENERATOR, SOUTH NORWALK, CONN., ELECTRIC WORKS

SOUTH NORWALK POWER-PLANT BUILDING

pendent of breakdowns in transmission line, which would carry the essential load in case of emergency and showed considerable operating savings in the cost of current.

1,600-Hp. Diesel Installed

After careful investigation of the equipment available, it was decided to install an 1,110-kw. diesel-engine-driven generator, consisting of an eight-cylinder 1,600-hp. McIntosh & Seymour diesel engine and General Electric generator. This generator was wound for three-phase, 60-cycle 2300-volt a.c., as with the growth of load considerable alternating-current equipment had been installed in the district and sufficient rotary converter capacity was available to transform as much of this as needed for direct current. This generator was arranged to run in parallel with the lines of the utility from which power was purchased and the necessary safeguards were installed to protect both the incoming power line and the engine in case of any line trouble.

A survey of the plant had shown that the most desirable location for the new engine was the space occupied by the old abandoned boiler room. This building was removed and a new engine room built in its place, of sufficient size to house two engines of the above capacity. A 15,000-gal. fuel-oil tank was installed and arranged to supply fuel to this engine and the future engine contemplated. A cooling water system consisting of circulating pumps, cooling tower and sump tanks was installed and arranged to recirculate all of the engine cooling water.

Air filters of dry airmat type were provided for the engine air intake, so as to remove all possible dust from the incoming air. A centrifuge of sufficient capacity to pass the entire supply of lubricating and cooling oil once in eight hours was installed to operate on the continuous by-pass system. This complete system of auxiliaries was deemed advisable to insure the utmost reliability of the main unit.

Constant Demand on Purchased Power

In this plant the new diesel engine is operated so as to hold as nearly as possible a constant demand on the purchased power. It is operated from 12 to 16 hours per day, from 8 a.m. to approximately 11 p.m.—and during that period carries roughly one-half the load on the station. This method of operation has proven most economical under the terms upon which the balance of the power is purchased, and while it does not allow quite as large a proportion of the power to be generated as could be done by the continuous operation of the engine, it has proven very satisfactory.

The total cost of this plant enlargement, including engineering, was approximately $155,000. This included expenditures for additional building construction, rock removal for another engine foundation, and other equipment providing for the installation of another unit of similar capacity. Such additional costs are apportioned to be approximately $25,000, thereby reducing the amount chargeable against this unit to approximately $129,000, or about $116 per kilowatt, of which approximately $70 represents the cost of the engine, and the balance the cost of building, electrical connections and auxiliaries. Westcott & Mapes, Inc., of New Haven, Conn., were the architects and engineers.

DIESEL-ENGINE KILOWATT-HOUR COSTS
SOUTH NORWALK ELECTRIC WORKS

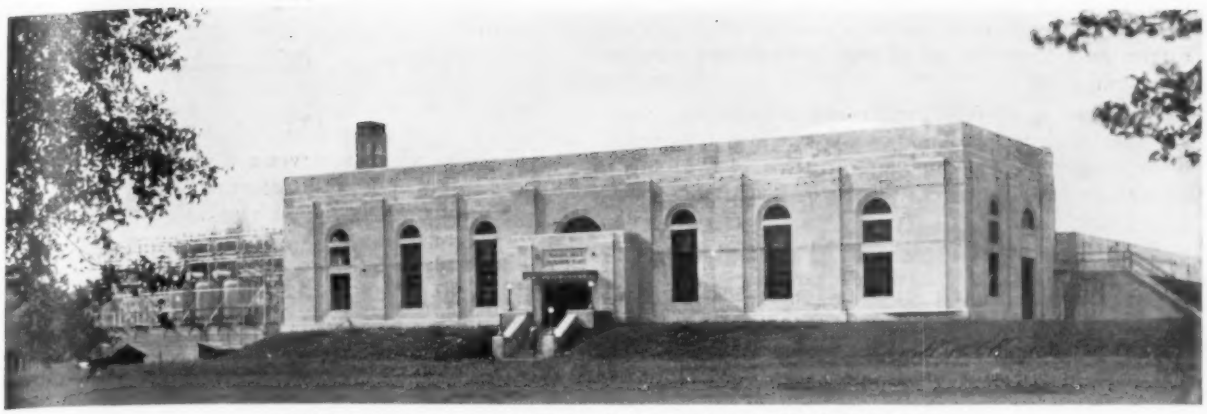
	October, 1931	Per Kwh	March, 1932	Per Kwh
Operating Data				
Engine operation	265 hrs		238 hrs	
Gross output	254,500 kwh		228,000 kwh	
Less auxiliary motors service	8,070 kwh		7,100 kwh	
Net output	246,430 kwh		220,900 kwh	
Fuel oil consumed	23,396 gals		22,014 gals	
Net kwh per gal oil	10.53		10.03	
Highest demand	1,150 kw		1,100 kw	
Operating Costs				
Fuel oil: 23,396 gals @ $0.0575	$1,345.27	0.55¢		
22,014 gals @ 0.04875			$1,073.18	0.486¢
Engine cylinder oil; 28½ gals. @ 0.53	15.11			
18½ gals @ 0.53			9.81	
Air-compressor cylinder oil: 1 gal @ 0.77	.77			
1 gal @ 0.71			.71	
Bearing and cooling oil (est.): 30 gals @ 0.44	13.20		13.20	
Total cylinder, bearing and cooling oil	29.08	.012	23.72	.011
Cooling water	30.05	.012	16.34	.008
Waste and wipers (est.): 100 lb @ 0.15	15.00	.006		
100 lb @ .12			12.00	.005
Attendance: 2 men, half time, @ 0.57 per hr. each	151.05	.061		
1 man, 238 hrs @ .75, $178.50				
1 man, 119 hrs @ .60, 71.40			249.90	.113
Total operating cost	$1,570.45	.64	$1,375.14	.622
Fixed charges (based on estimated $125,000 investment cost)	Per Mo.			
Depreciation @ 7½% per annum	$781.25			
Interest @ 4½% " "	468.75			
Maintenance @ 1½% " "	156.25			
Total fixed charges	$1,406.25	.57	$1,406.25	.637
Total cost	$2,976.70	1.21¢	$2,781.39	1.26¢

EDITORIAL NOTE.—The above monthly figures, representing operating results under somewhat different conditions of output and operation, are furnished through the courtesy of W. H. Dieringer, General Superintendent for the Board of Electrical Commissioners, in charge of the South Norwalk Electric Works.

In response to an inquiry from THE AMERICAN CITY regarding present arrangements for engine attendance Mr. Dieringer states: "In our recent diesel-engine operating data we are charging one man full time and one man half time to engine operation. This allowance is probably in excess of the attendance that is actually needed, but in order to amply provide for all charges that should be made against the diesel operation, our attendance items are to be made on such a basis as given in the March report. The hourly rate has also been changed so as to cover our skilled operators who more or less attend to our diesel operation."

The 1932 Municipal Index

contains articles on three noteworthy municipal power plants, as well as an illustrated section on the I. E. S. Street Lighting Code (see page 113 of this issue of THE AMERICAN CITY.)



A GENERAL VIEW OF THE NIAGARA FALLS, ONTARIO, FILTRATION PLANT

The Strictly Modern Pumping and Filtration Plant at Niagara Falls, Ontario

By H. G. ACRES
and
S. W. ANDREWS

H. G. Acres & Co., Ltd.
Consulting Engineers, Niagara Falls, Ont.

BEFORE the new water works at Chippawa, Ont., was placed in operation, Niagara Falls, Ont., was supplied with chlorinated water pumped direct from the Niagara River. Originally the point of intake for the pumping station was just above the Falls, but changes in the flow of the river at this point, due to recession of the crest-line and other causes, finally destroyed the value of this intake, and of recent years the water supply has been taken from one of the conduits of the Ontario Power Co. Down-lake gales on Lake Erie frequently produced a condition of turbidity, which, coupled with heavy chlorination, rendered the water supply unfit for use. The pumping station had also become obsolete as to equipment, and as it was situated in the center of the Victoria Park area, there was no satisfactory or permanent means of extension.

Confronted with this situation, which had already reached an acute stage, the Board of Water Commissioners decided, in 1930, to have the problem studied and to obtain for the city an adequate and assured supply of raw and filtered water, suitable for many years to come.

A study of the general plan of the district and the conformation of the Niagara Gorge showed conclusively that any new water supply must come from the south, and that unless that part of the Niagara River bank between the crest of the Falls and the mouth of the Welland River, or the north bank of the Welland River itself, proved totally undesirable, the location of the intake and plant should be fixed within these limits. It was decided, therefore, to locate the mouth of the new intake on the north bank of the Welland River just inside the protecting works of the Hydro-Electric Power Commission intake, and safely upstream from the outflow of any part of the local Chippawa sewage system. This location has the advantage of water drawn from the deepest part of the Niagara River and is protected from floating river ice and débris by the concrete intake structure and diversion wall of the Power Commission. Furthermore, the mouth of the intake is only 500 feet from a freehold site of sufficient area to accommodate a pumping and filtration plant of a much greater capacity than 40,000,000 gallons per day, at the same time affording excellent foundation conditions at such elevations that there will never be any danger of contamination either from surface or from raw river water.

The Intake

The intake extends from the water's edge at a point 18 feet below water level and 16 feet above the bottom of the Welland River. The concrete breast wall, in which is embedded the mouth of the intake pipe, is placed at the water's edge and is supported on timber piles driven to rock. The intake pipe is a 48-inch reinforced concrete pipe with grouted joints laid in gravel. The dimensions of the intake as a whole are such that the plant can be extended to double the original installed capacity without further increasing the intake facilities, and the velocity at the intake mouth and through the pipe line will be so low that there will be no danger of diverting any appreciable amount of foreign matter from the main stream of the river.

General Design of the Plant

The design of the plant was not influenced by any peculiarities of the site or general location, and it was therefore possible to work unhampered toward clear lines of flow and to produce a simple layout, containing all the elements necessary for the proper treatment and delivery of the water. All material and equipment can be delivered into the building by truck at grade level, and practically every piece of equipment can be reached by either one

of the cranes. Standard pipe and fittings, with no specials, were used in every case, and all operations that could be carried on without the use of moving machinery were so arranged.

The plant is of reinforced concrete throughout, and has been designed and proportioned to properly house the equipment, basins and filters in the most compact manner possible, with a central control room from which all the main elements of the plant are either actually within view or readily accessible. The filter and sedimentation section can be extended both longitudinally and laterally, maintaining the same general arrangement and appearance, while the pumping section, which has been designed as a permanent front and entrance to the whole, has all the elements of a 40,000,000-gallon-per-day plant.

Operating Cycle

The low-lift, or raw-water pumps raise the water from the river elevation to the mixing chambers, from which it flows down one side of the plant through the settling basins, and back along the other side through the filter section to the high-lift pumps, which are located in the same room as the low-lift pumps. All the treatment is applied within this circle.

Raw water enters the plant from the intake pipe, which discharges into an intake chamber at one end of the pump section of the building. The intake chamber is adjacent to and separated from the screen chambers by a concrete partition in which are openings for the passage of the river water to the screens. The screens, which will be two in number, are placed in separate chambers arranged so that either can be dewatered for inspection of repairs. They are of the revolving type, motor-driven and provided with high-pressure sprays for the removal of all débris collected. The cleaning water and débris are carried, by means of a steel trough, to an auxiliary removable bucket type screen which retains the solids and allows the water to flow back to the intake chamber. Each screen has sufficient capacity to allow the passage of 20,000,000 gallons of water per day without exceeding a velocity of 2 feet per second. From the screens the water flows through another partition to the suction chamber. Each of four entrance and exit openings to the screen chambers is provided with a heavy cast iron brass-fitted sluice-gate operated from the screen-room floor level through a spindle, gears and hand-wheel.

The Alum Machines

The suction chamber is immediately below the room which houses the alum machines and sump pumps. The floor of this room forms a cover for the chamber and serves as the foundation for the alum machines, which are so placed that alum is dropped directly from the machines into the screened raw water as it leaves the suction chamber to pass into the low-lift pump suction header. This floor is approximately 10 feet below the outer grade level, and chemicals are delivered to the storage room, directly above, by trucks, dumped into the machine hoppers and passed by gravity to the point of application.

The alum machines are of the dry-feed type, motor-driven and hand regulated. They are equipped with hoppers extending through the ceiling of the room to the storage room above. Each machine can be regulated to feed alum to the raw water at a rate as high as 500 pounds per hour.

Pump Arrangement

The pump suction headers are placed beneath the basement floor of the pump room. Each is located under the line of pumps which it serves and runs longitudinally as to the pump room. The raw-water header is fed from the suction chamber after receiving its dose of alum, and the clear-water header is fed from the outlet of the clear-water reservoir. Both headers have a capacity sufficient for a plant of 40,000,000 gallons per day, and a 24-inch interconnection, with valve, is provided so that the filters can be by-passed in emergency.

The pump room occupies the major portion of the entrance building and the main floor, and is open to view from the control room and galleries connecting the various parts of the plant. Six pumps have been provided, three each for the raw and the filtered water. They are supported in two rows on beams which in turn are carried by columns to the basement floor. The floor, beams, columns, pump connections, etc., have all been arranged to receive the largest pumps which it is expected the plant will ever require. The existing pumps are placed at the fixed suction locations, and the discharge and series piping designed to meet the dimensions of the larger pumps.

All the low-pressure pumps are new and of the single-stage bottom double-suction volute-type driven by squirrel-cage motors. They operate against a total head of 35 feet. Two have a normal capacity of 6,000,000 gallons per day, and the third has a capacity of 3,000,000 gallons per day. Motors have been provided with ratings in excess of that required to drive the present pumps, so that an increase in pump capacity in the near future will not necessitate the purchase of additional drives for the increased capacity of the pumps.

The layout of the station includes three two-stage bottom double-suction volute-type high-pressure pumps with capacities corresponding to the three low-pressure pumps. Two pumps are available, however, from the old station, and these have been installed at Chippawa. The installation of these old pumps did not affect the permanent layout except that the piping was necessarily somewhat more complicated and the floor openings misplaced. One new pump was purchased having a capacity of 6,000,000 gallons per day against a head of 265 feet, and the characteristics of the old pumps were changed to meet the new conditions.

The pumps are controlled on the main floor, each having a control pedestal upon which are mounted the discharge and suction gages, an emergency light and a push-button start and stop switch. There is also a push-button switch on each pump panel of the main switchboard. The control pedestals for the high-pressure pumps also carry the control for the discharge valve. These valves are of the Larner-Johnson balanced hydraulic type and are combination stop and check valves. Normally, the valve closes when the pressure on the pump side is lower than that on the header side, and tends to open as the pressure is built up in the pump upon starting. There are two discharge valves for each low-pressure pump. One is the conventional gate valve with gears and offset spindle, operated from the main floor by means of a floor stand, and the other a low-pressure disc type positive check valve.

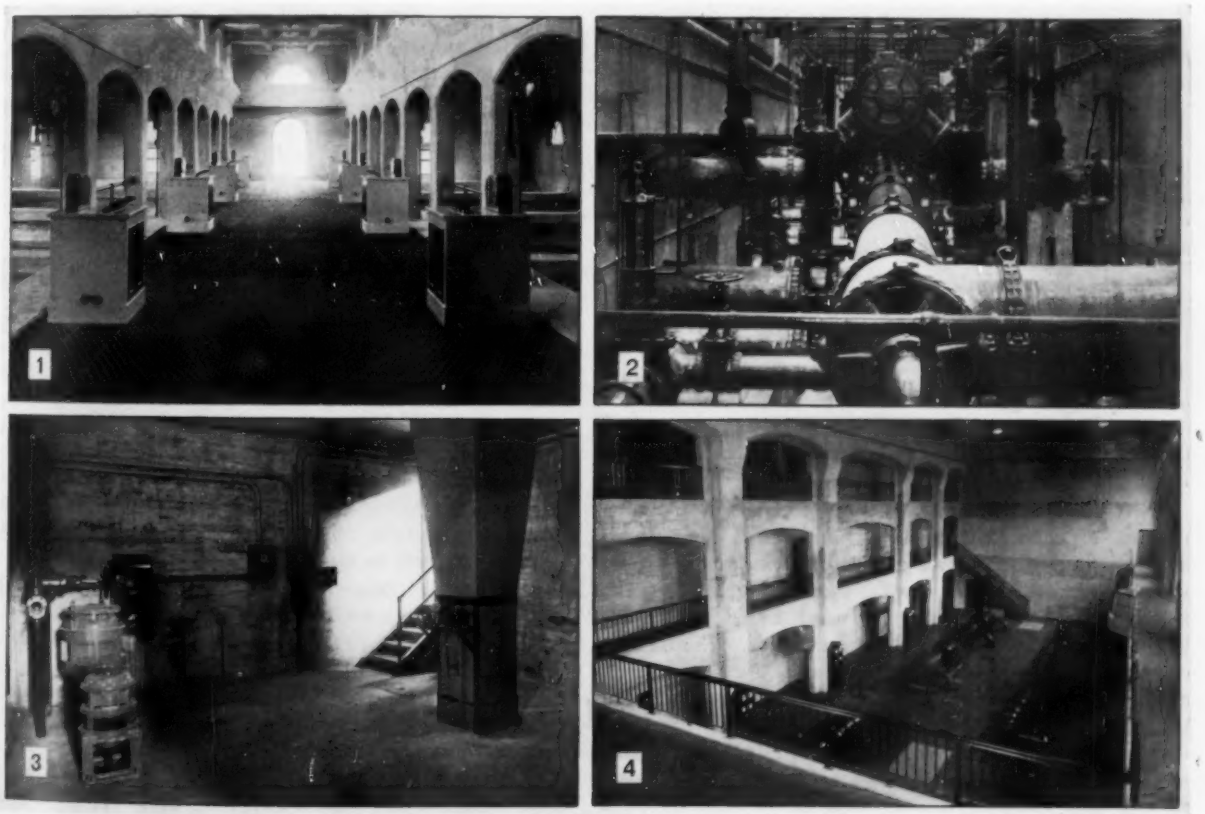
The Pump Discharge Header

The header has a capacity sufficient for a plant of 40,000,000 gallons per day, to the wall of the building, where it is divided into two 24-inch branches. One branch is blanked and the other passes through the foundation wall, terminating in a valve chamber just outside the building. The venturi tube and station cut-off valve are placed in this outside length. The first measures the discharge from the filtered-water pumps, and the second serves to disconnect the station from the supply main which leaves the plant from the valve chamber. The meter register is located on the pump floor near the high-pressure pumps.

The low-pressure header is of class A cast iron pipe with Victaulic joints. The header proper has a capacity of 40,000,000 gallons per day. It branches, however, to two lines of half this capacity at a point beyond the last pump connection. One of these branches is blanked, while the other rises and crosses the basement to the dividing wall between the pump section and the three mixing chambers, where three 20-inch connections are made to pipes which rise along the wall to the pump room floor. Each of these pumps enters one of the mixing chambers and can be shut off by means of a hand-operated gate valve located above this same floor. The venturi meter, which measures the raw-water pumpage, is located in the cross-over pipe between the header and the mixing chambers, and the register is on the operating floor above. This pipe line also carries a specially constructed hydraulic gate valve which serves the purpose of a regulator for the flow of raw water to the filters by its throttling action on the low-pressure pumps, and is controlled by means of a pilot valve located in the gallery on the pump floor level.

Mixing and Sedimentation

After the alum application at the entrance to the suction header, the water and coagulant receive a thorough and violent mixing as they pass through the raw-water pumps. The next step in the treatment occurs in the mixing chambers, where the mixture is kept in constant motion through the agency of its own velocity and the design of the chamber. The period of retention is from 20 to 40 minutes, depending upon the rate of flow. The capacity of the chambers is such that three will handle the water at the rate of 20,000,000 gallons per day with a retention period of about 20 minutes. During this period the coagulant forms the floc. From each mixing chamber the water and suspended floc pass to the stilling chamber, which is merely an open space in the sedimentation basin and behind a partition wall so placed as to still the velocity of outflow from the mixing chamber and cause the water to begin its progress at a low velocity uniform over the entire cross-section. The capacity of the three sedimentation basins, as built, is 10 mgd with a 2-hour retention period. The additional capacity to conform with that of the mixing chambers will be attained by lengthening the basins. From the basins the water passes over weirs to the flume which carries it to the filter section of the plant.



GLIMPSES OF A NOTABLE CANADIAN FILTRATION PLANT

1. The operating floor with a grating to permit lighting and ventilation of the pipe gallery below. 2. The pipe gallery. 3. The dry-feed chemical machines. 4. The pump room and galleries

Details of the Mixing Chambers

Each mixing chamber is divided into four equal parts by vertical partition walls. Water is brought into one of these four parts by means of the discharge piping from the low-lift pumps. The water discharges at floor level, parallel to and along one side wall. The action of the water flowing in this manner imparts a circular motion to the whole body of water. Water flows out of this quarter of the chamber at the top through an opening so located that it will not interfere with the direction or velocity of the water. Thus the water, after entering, moves slowly through this section of the chamber with an upward spiral motion to discharge into the top and along one side of the second section. In the second and fourth sections the spiral motion is downward. The layout of the chambers has been found to impart a motion to the mixture of water and coagulant which affords a thorough contact at velocities which allow the formation of a good floc without excessive settling in the chambers. Provision for cleaning has been made by the installation of open underdrains to the sedimentation basins. Free inter-flow during normal operation is prevented by a weighted flap valve at the sedimentation basin end of the drain.

Sedimentation Basins

Provision for cleaning the sedimentation basins is made by means of sloping floors to a central gutter, which in turn slopes to an opening to the main sewer at the discharge end of each basin. This opening is controlled by a cast iron sluice-gate operated from the roof of the basins. A pressure water line supplies the water necessary for flushing. The outside walls of the basins are protected by an embankment built to the water level, and the roof is insulated by a 1-inch covering of impregnated fiber-board surmounted by a standard bonded tar and felt roof.

The overflow weirs are supplied with an angle iron lip placed at an elevation 6 inches below normal water level at the filters, and stop-logs are provided to prevent a reversal of flow when any basin is shut down from cleaning or inspection.

The Filters

After passing over the weirs from the sedimentation basins, the water crosses to the filter room by a concrete flume built with a sufficient cross-section to carry 20 mgd at a velocity not in excess of 2 feet per second. A circular outlet, 48 inches in diameter, is provided at the center of the filter room. This is controlled by a sluice-gate and leads into the filter influent main.

Each filter bed has an area of 540 square feet and a nominal capacity of 1,250,000 gallons per day. The beds are each divided into two sections by the central gullet walls. It is between these walls that the water enters the filter unit and also here that the wash water leaves after having passed through and cleaned the beds. The influent enters through a 14-inch pipe from the influent main, and the wash water passes out of the bottom of the gullet through a 24-inch opening to the main 24-inch cast iron drain, which is located on the floor of the pipe gallery and extends under the sedimentation basins to the outside 36-inch concrete drain. Each filter bed has eight cast iron water troughs, supported at one end by the gullet wall and at the other by adjustable hangers fastened to the filter side walls. The underdrainage system for each filter is composed of 2-inch cast iron pipe laterals spaced 6 inches apart and interconnected by a central cast iron header equivalent in capacity to an 8-inch pipe. Holes, drilled in pairs, are located in the underside of the pipe lateral, one on each side of the vertical diameter and at 45 degrees to it. The headers also have openings to provide for an even distribution of filtration and for completely draining the bed. The capacity of the underdrain system is such as to allow backwashing at a rate equivalent to a 24-inch per minute rise in the bed. The filtering material is placed in six layers, five of gravel and one top 27-inch layer of sand. The gravel varies in size from 3-inch to 1/16-inch.

The pipe gallery carries the influent main at the top in line with the outflow opening in the flume from the settling basin. The wash-water main occupies the intermediate position, and the drain rests on saddles on the floor of the trench. The two upper mains are supported on hangers attached to the steel floor system above the gallery. All the pipe and the fittings are of cast iron and are standard.

One feature of the piping at the filters, as well as all piping throughout the plant, is the use of Victaulic joints on all sizes above 8 inches in diameter. These joints were specified to insure freedom from leaks; rapid assembly of piping with a minimum of labor and tedious fitting; flexibility and the ready removal of any length of pipe, fitting or valve without the necessity of disturbing any adjacent piece. Two of these joints were placed in the vertical sections of each pump suction and discharge in order to provide flexibility.

Besides the mains, each filter has in its own individual pipe system, a 14-inch influent pipe, a 24-inch drain pipe, an 18-inch wash-water pipe which connects with the underdrain system, a 12-inch effluent pipe, which connects the underdrain system to the 12-inch rate controller, and an 8-inch cross-connection for filter re-wash. Each of these pipes is controlled by a gate valve of corresponding diameter, and those in the first four mentioned are actuated hydraulically from a high-pressure header which runs along the gallery. The control for all the hydraulic valves in each filter unit is centered in an operating table placed opposite the filter on the floor above the gallery. The re-wash valve is hand-operated.

Pressure water for the valve-operating header is taken from the main discharge header at the high-lift pumps. As an auxiliary source of operating energy, an accumulator tank is installed which floats on the line and can be used to operate all the valves in the plant in case of loss of pressure in the main. A suitable valve system and an automatic motor-driven pump insure full pressure in the accumulator tank at all times.

Wash water is stored in an elevated steel tank placed on the roof of the sedimentation basins. The tank has a storage capacity of 70,000 Imperial gallons, which is sufficient for washing two beds. An eductor placed over the outlet pipe from the filtered-water reservoir discharges into the wash-water system at a rate sufficient to fill the tank in two hours. Pressure water is received direct from the high-pressure main. This provides a simple arrangement for supplying wash water, and, while lacking somewhat in efficiency, eliminates the evils of maintenance and shut-downs inherent in moving machinery. A gage installed on the wall above the eductor control valve in-

dicates the water level in the tank. An alarm bell is also provided to warn operators when the tank is full.

Each filter has its individual operating table equipped with loss-of-head and rate-of-flow gages and the necessary operating valves and indicators for the filter gate valves. The floor is an open grating supported by steel beams, and a sufficient number of sections are removable so that the hand-operated traveling crane can reach any piece of equipment in the pipe gallery. The open floor admits light to the gallery and makes good ventilation possible.

After passing through the rate controller, the filtered water drops through the floor of the pipe gallery into the filtered-water reservoir. The reservoir occupies all the space beneath the filter section and has a storage capacity of 800,000 Imperial gallons. Its outlet is 36 inches in diameter and is located near the pump room wall. A short run of welded plate steel pipe and a 36-inch hydraulic valve serve to connect the outlet with the filtered-water pump header.

Chlorination

Chlorine is applied at the reservoir outlet, just as the water enters the pipe. Provision is also made for chlorination of the raw water at the entrance to the low-pressure suction header. This latter treatment will be used only if it is necessary in emergency to by-pass the filters and pump raw water to the distribution system. The chlorine room is located just beneath the electrical control room and contains two vacuum type chlorinators with scales. The chlorine dose is regulated manually, and a valve and piping system is provided so that either or both machines can feed to either or both points of application.

Electric power is supplied through an outdoor substation erected adjacent to the building. The station consists of a bank of three 650-kva. transformers with necessary disconnects, oil breakers and main leads. All electrical operation is centered in a control gallery overlooking the pump room floor, and all operations in connection with starting and stopping the pump are effected by automatic parallel push-button switches from the pump-room floor or from the central gallery. Power is available over two separate lines and from three alternative sources of supply.

All of the mechanical appliances and piping were furnished and installed by the Roberts Filter Co. of Canada, Ltd., Toronto. The rate controllers and gages for the filters, which represent one of the largest expenditures for equipment, were manufactured in part in Canada and in part by the Builders Iron Foundry, Providence, R. I.

Paving the Suburban Section

Suggestions for Low-Cost Residential Roads

IN nearly every city of any appreciable size there are suburban sections which demand some sort of finished pavements. The abutting property is not of such a valuation as to stand any assessment in excess of 25 cents per foot, and as a general rule the pavements are made 18 feet wide in these sections, not including curb and gutter, which consequently sets a top price limitation of the amount that could be paid per square yard. Many cities spend annually in the maintenance of unimproved gravel-chert-cinder and similar types of roadways an amount equal to approximately one-half of this figure, and after spending this money really have very little or nothing in the line of finished work to show for their money. Maintenance departments of course are not charged with construction except in minor instances—and yet maintenance departments are not justified in continuance of an expenditure year after year that does no more than barely hold what was originally there. Maintenance not only must hold the original investment, but should by slow stages gradually improve existing conditions. This can be done if a well-planned program is followed and common-sense, coupled with technical skill, used in the selection of methods and materials.

People living in residential sections do not consider a good gravel road or street suitable. They must have a "black top" or a "white top" on the road. Therefore the psychological effect of even a minor finished improvement has its weight. They simply do not want to live on so-called "dirt streets."

Low Cost Does Not Mean Poor Work

Remember that low cost does not mean poor work—in materials, workmanship or finish. It takes far more skill and judgment to build a good low-cost road than a good high-cost road. Slovenly or sloppy low-cost roads represent money thrown away, and unless you really plan to do the job properly, using the proper amounts and types of materials—"*don't do it at all.*"

Low-cost road construction is not a question of "half a loaf is better than none at all." A halfway built low-cost road is not worth even half a loaf. Do what you can afford to do, but do it right. Don't try to spread a low-cost program further than it will stretch. There is no economy in such an operation.

Drainage

The first step in low-cost residential roads is good drainage. This is absolutely essential. The water table must be kept well below the surface; just how far depends on the soils and types of roads being improved. No hard-and-fast rule can be set as to whether it be 6 inches or 18 inches or 30 inches. That question can be answered only by experience. In the territory surrounding Washington, D. C., 6 inches has been found to be the minimum; 10 inches is better if obtainable. This figure represents the distance

between the high water table and the low limit of the bottom of the low-cost road. This can be materially helped by adequate gutters, keeping of course as far away as possible from excessive barrel types, using low crowns not in excess of 4 inches for 18-foot roadways, with the majority of the crown from the quarter point to the edge of the gutter.

Preparation for Improvement

Prior to any low-cost improvement of a roadway, a survey should be made at least 90 days in advance of the treatment, and immediate steps should be taken to bring the roadways to a proper section and good riding grade. It is poor economy to put a good low-cost road on a poor riding surface.

In addition to this sectioning there are bound to be areas in which the common factor of stability is far below the average. These areas must be stabilized with aggregate so that the entire roadway presents as uniform a type as possible. Experience has shown that the use of an aggregate commercially sized ¾- to ⅜-in. is best suited for this work, for this size can be easily worked with a road grader or planer.

Types of Residential Roadways

In low-cost residential roadways there are two types to be considered, and each must be considered separately: (1) those well-compacted and solid types from which all loose materials can be swept; (2) those poorly compacted types, such as loose gravel-chert-cinder, etc., which cannot be swept.

FOR PRIMING GRADE 1

Tar—Grade T.C. 1 or 2 cold
Asphalt—Grade O.P. 2. cold

Prime:—Tar meeting the following physical and chemical requirements:

	Minimum	*Maximum*
Spec. gravity 77 F.	1.090	
Spec. viscosity 104 F.	8	13
Total distillate by weight 338 F.		7%
Total distillate by weight 518 F.		32%
Total distillate by weight 572 F.		42%
Softening point of residue		140 F.
Soluble in CS2	90%	
Water		2.0%

Prime:—Asphalt meeting the following physical and chemical requirements:

	Minimum	*Maximum*
Gravity (Baume)	12.5	17.5
Flash point (open cup)	135 F.	175 F.
Viscosity (Furol 122 F.)	45 F.	60 F.
Spec. viscosity (Englor 122 F.)	10	15
Spec. gravity (60 F.)	.930	.975
Tests on Residue		
Off at 600 F.	25%	35%
Off at 680 F.	37%	47%
Penetration 77 F.	150	200
Solubility in CS2	99.85%	

For priming grade 2.

Tars are not recommended for poorly compacted types unless the surface treatment price range is to be exceeded and the investment extended into the mulch treatment, which is one step above the low limit of the average initial low-cost roadway. Our experience in Washington tends more towards the use of the asphalt prime rather than the tar for the poorly compacted types.

FOR SEALS—GRADE 1

Tar—T.H.1 hot or T.C.4 cold
Asphalt—A.R.1 Y or Virginia O.C.5

Seal Coat:—Cutback asphalt meeting the following specifications for physical and chemical requirements:

	Minimum	*Maximum*
Spec. gravity 60 F.	0.91	
Flash point (open cup)	100 F.	125 F.
Spec. viscosity (122 F.)	18	25
Tests on Residue		
Loss 5 hrs. 50 gr. 325 F.		25%
Penetration 77 F. 50 Gr. 1 sec.	20	
Paraffin scale (Holde)		2.5%
Adhesiveness (Osborn)	200 sec.	
Soluble in CS2	99.0%	

PHYSICAL AND CHEMICAL PROPERTIES

The refined tar shall meet the following requirements:

1. Specific gravity 25°/25°C. (77°/77°F.), not less than 1.40
2. Float test at 32° C. (89.6° F.), 60 sec. to 150 sec.
3. Total distillate by weight:
   - To 170° C. (338° F.) ..... not more than 10%.
   - To 270° C. (518° F.) ..... not more than 15.0%.
   - To 300° C. (572° F.) ..... not more than 25.0%.
   - (a) Softening point of residue, not more than 65° C. (149° F.).
4. Bitumen (soluble in carbon disulphide), not less than 85.0%.

COLD APPLICATION TAR, T.C. 4

Spec. gravity 25/25° C.—77° 77° F. Not less than	1.100 to 1.18
Spec. viscosity at 40° C. (104° F.)	25 to 35
Total distillate by weight	
338° F. not more than	3%
518° F. " " "	30%
572° F. " " "	40%
Softening point of residue, not more than	104° F.
Soluble in CS2 Not less than	90%
Water, not more than	2%

For cover materials, either standard blast furnace slag, clean limestone chips or crushed gravel from ¾- to ⅜-inch is satisfactory.

Methods of Construction—Type 1 (Compacted Roads)

1. The first step is to thoroughly sweep the surface to rid it of all dust, dirt, trash, etc., leaving the swept-off material in a windrow at the margin of the road to prevent the prime material from flowing from the crown into the gutters. This will build up a heavier section along the edges, rather than let the bituminous material dribble off into the gutters.

2. The rate of application of prime material varies with the porosity of the top of the roadway material. As a general rule, 0.3-gallon should be the low limit and 0.5-gallon should be the top limit. If there is any doubt as to just how much to use, call on some one who knows; don't just go ahead and guess at it. An under-primed road is just as bad as an over-primed road. Usually the producer supplying the material has engineers who are competent to advise you. It is difficult to get it just right, but this can be accomplished by either experience or competent advice. The latter is the cheaper.

In the use of tars the preference seems to be the elimination of cover material on the prime. Simply allow penetration and keep the road closed. If the road cannot be closed, a small amount of cover material, from 10 to 15 pounds per square yard, must be added.

In the use of asphalt for prime the preference is for from 10 to 15 pounds of cover material thoroughly rolled. With the road properly primed, it is best to allow from two to three days to elapse prior to the application of the seal coat. This allows the material to properly penetrate and set, and in case the street has been subjected to traffic, makes possible the repair of any weak spots prior to sealing.

Unless the roadway has become dirty or large amounts of clay or other foreign matter are upon the surface, sweeping is not considered necessary prior to the application of the seal coat. For tars the application rates seem to be from 0.3- to 0.4-gallon per square yard. For asphalts from 0.35- to 0.5-gallon per square yard.

The cover material should be applied by hand or by spreading machines as soon as possible after the seal coat. The sooner rolling can start on the cover material, the better the final result will be. One of the biggest faults

found is insufficient rolling or compaction. Roll it thoroughly and then roll it some more. Don't try to break up the edges, however.

In figuring for cover material, allow always for about 1.5 pounds per square yard to whip off, never stint cover material. For the various materials used in covering seal coats the following amounts should be used:

Slag	33 to 38 lbs. per sq. yd.
Stone	40 to 48 " " " "
Crushed gravel	45 to 55 " " " "

These ranges in pounds correspond to the rates of application given for bituminous material in gallons and vary directly with each other.

A low-cost road of the foregoing type can be readily constructed under contract and for a price not in excess of 25 cents per square yard to include a contractor's legitimate profit. It will carry from 300 to 750 vehicles per day for the first year, after which it should have a follow-up seal coat. With such treatment it is good for three to four years, or until traffic increases to such an extent that it is outside the limit of the carrying capacity of the base.

For Type 2 construction, asphalt O. P. 2 should be applied at the rate of 0.3- to 0.4-gallon per square yard and then mixed thoroughly with an ordinary disc harrow pulled by a truck or tractor. Aggregates at the rate of 10 to 15 pounds per square yard should then be spread uniformly and the same asphalt applied at the rate of 0.2- to 0.3-gallon per square yard and again thoroughly mixed with a disc harrow. A road grader should be used to smooth and shape the material to final section. This type of road must be permitted to stand not less than two days to secure the best results. The seal coat is applied in identically the same manner as that outlined for Type 1.

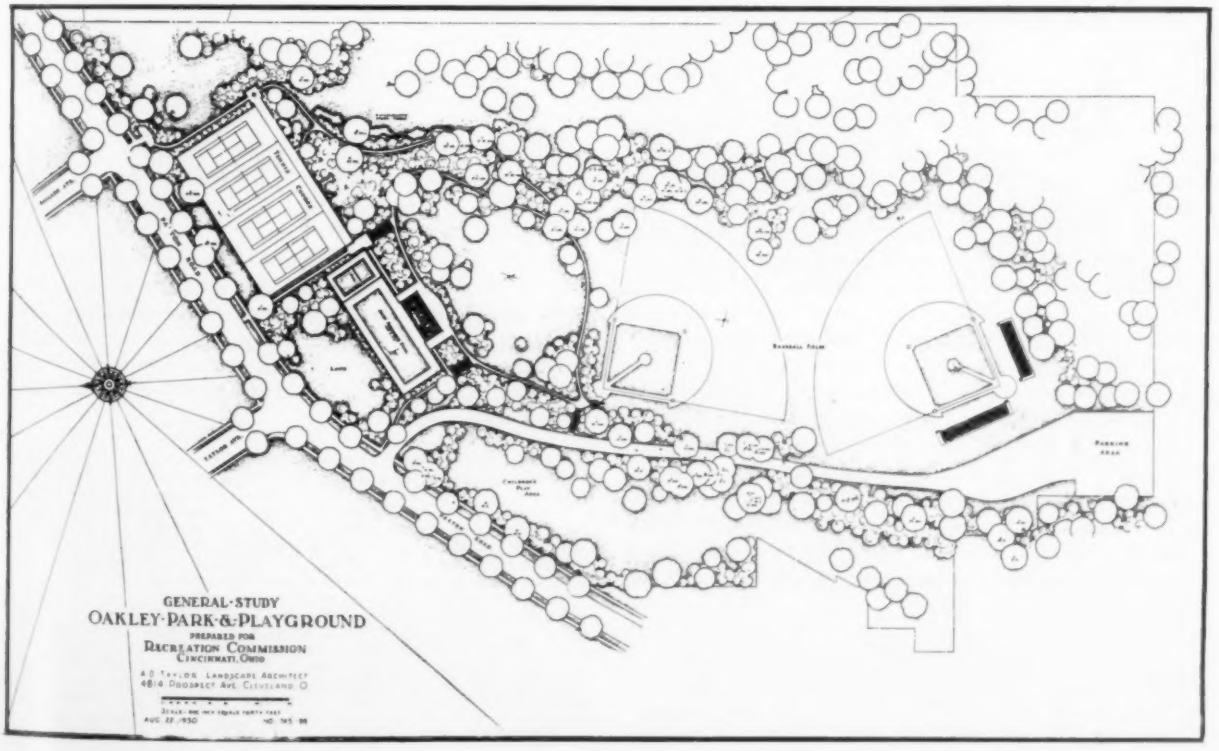
Many engineers question the application of any aggregate in the priming and mixing operation, but experience has proved many times over the value of introducing this material. The manipulation of loose tops without the additional aggregate tends to promote pushing and shoving, while loose tops treated with a small amount of aggregate worked into the prime rarely if ever push or develop bituminous rolls.

ACKNOWLEDGMENT.—A portion of the report of the Committee on Maintenance of the American Road Builders' Association, prepared by the Chairman, Major F. M. Davison, Maintenance Engineer, District of Columbia.

Cincinnati Playgrounds Capitalize Rugged Topography

CINCINNATI is rapidly taking a first-rank position among those cities which are providing adequate and attractive recreation fields for their citizens. During the past five years a group of playgrounds has been developed by the Cincinnati Recreation Commission, in accordance with plans made by its consultant, A. D. Taylor, landscape architect, of Cleveland. The rugged topography of most of the areas available has been utilized to create unusual layouts not possible on the average flat or even-surfaced ground.

The accompanying drawing of the Oakley Park and Playground shows one of the most interesting recreation fields. It is part of a large tract, the remainder of which is owned by the Cincinnati Park Board and used for "passive" recreation. On the uppermost level of the developed property are two regulation baseball diamonds. The intermediate area has been used for a recreation building and swimming pool, fitted into the sloping bank. A battery of concrete tennis courts has been developed on the next lower level, in close proximity to the recreation building. In a small valley or swale, opportunity was presented for the creation of an informal recreation spot for small children. Various age groups can therefore enjoy wholesome recreation in attractive surroundings.



Snow Removal in Nova Scotia

Demand for Clear Roads in Winter Increasing

By **R. W. McCOLOUGH**
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Halifax, N. S.

WHILE snow removal has been carried on in the United States for some time, it is only during the past few years that this has been done in Canada. Ontario has been removing snow since 1925, and last year snow was removed from over 2,000 miles of highway. Quebec first removed snow in the winter of 1928-29, and at that time less than 100 miles was cleared.

As in the case of dust laying, it is only in recent years that any popular demand has arisen for keeping roads open in Nova Scotia during the winter season. The old-fashioned sleigh is no longer available to winter travelers, since the livery stable has been replaced by the garage. Merchants in small municipalities not served by rail depend on the motor truck to replenish their stock of goods, which is generally only a fraction of what formerly had to be stored to carry them through the winter. Passenger service, mail service, and many other necessities of modern civilization call for a continuous use of the highway the year around. The Provincial Government of Nova Scotia has not undertaken responsibility for snow removal; the responsiblity for this work still rests with the municipalities. Probably for many years to come the Government of the Province will not be able to assume responsibility for the removal of snow from all the highways.

Proper Equipment Necessary

It is the popular idea that snow can be removed from roads by the existing maintenance machinery or by plows and tractors. While it may be true that in sections where the snowfall is light the snow could be cleared without the use of special equipment, it must be remembered that when the Provincial Government assumes responsibility for the removal of snow from any section of highway, it must be prepared to keep the highway clear at all times, and this requires special snow-removal machinery. Two classes of machinery are required: (1) light plows attached to fast-moving trucks which can cover the ground in a short time; (2) heavy plows attached to tractors which are capable of moving the heaviest drifts. There are several types of heavy plows, the most popular being the V-plow. Even a heavy V-plow is unable to cope with deep drifts, and it is then necessary to employ rotary plows. The rotary plow is necessarily expensive to operate and is therefore employed only when heavy drifts are encountered. Equipment consisting of a combination of rotary and V-plows is now on the market, and this would seem to be the best equipment when heavy drifts are encountered, as the rotary is used only when required.

It is essential that snow be removed quickly, for mild weather following a snowstorm is likely to create a hard crust and compacted snowbanks, which are most difficult for any equipment to remove.

Procedure

In snow removal it is necessary first to clear the track used by motor vehicles. When this has been accomplished, the cut must be widened, so as to provide space in which the snow brought down by the next snowstorm can be piled. At places where snow drifts, it is essential to erect snow-fences of either a portable or a permanent type. It would not be profitable to keep a snow-plow continuously near such locations, and it is therefore economical to erect snow-fences.

Provision for Sleighs

The work of providing for winter travel is not completed with the removal of snow. As provision must be made for sleighs, it is not possible to remove the snow entirely from the roadway. In these circumstances a rainstorm may produce an ice condition on the highway which would make it impossible for motor traffic to proceed. It is therefore necessary, if we are to take care of winter traffic, that material such as sand or cinders be provided for the sanding of certain sections of the highways which become coated with ice, and in the interest of safety isolated spots which become iced must also be similarly treated.

During the past year, in cooperation with the city of Sydney and the town of Amherst, we removed snow from the highways in the vicinity of those centers. The equipment used was a 30-horsepower tractor equipped with a V-plow. We found that while this equipment was able to cope with the ordinary snowstorm, it could not handle heavier drifts satisfactorily.

Costs

We have not had sufficient experience with this work in Nova Scotia to state definitely the cost per mile of snow removal, but in the province of Quebec it costs from $211 to $371 per mile per year. In the province of Ontario, snow removal costs from $80 to $100 per mile per season, while in Michigan it costs $74 per mile per season. No doubt the difference in cost between Quebec and Ontario is largely due to the greater depth of snow in the province of Quebec. A considerable amount of Ontario's snow removal is done in a section of the province where there is not a large snowfall.

EDITORIAL NOTE.—The text above is a portion of a paper presented by Mr. McColough before the Union of Nova Scotia Municipalities. In the discussion of a resolution based on this paper, several interesting points were brought out regarding the advantages of snow removal. A Counselor from Pictou County remarked: "Let me emphasize the fact that often after snowstorms many of our rural post offices are practically out of business for three or four days, as the roads are impassable." A Counselor from Luenburg County stated: "I know that on one occcasion in our district some thirty or forty teams going to town were held up because the roads were not cleared." The Counselor from Kings County reported: "Port Williams in the last few years has become an ocean port and this has been made possible by the open seasons we have had. Keeping the roads clear is a very vital matter to the fruit growers in the Annapolis Valley. We cannot expect to ship apples through the entire winter, but we did last year, and if our roads are closed, we certainly cannot do so."

Lima's Sanitary Improvement Program Completed

River Improvements and New Activated-Sludge Sewage Treatment Plant of Ohio City

By R. M. BATCH
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THE city of Lima, Ohio, began operating its new activated sludge type of sewage treatment plant the latter part of March, this year. The event marked the final major step in a program of sanitary improvements consisting of intercepting sewers, pumping stations, inverted syphons, regulator chambers, sewage treatment plant and river improvements. The collecting works portion of the program was completed in 1925, but, owing to a controversy concerning the type of treatment plant, the remainder of the improvements were not completed until this year.

River Conditions and Improvements

The Ottawa River flows along the edge of the business district and is bridged at eleven points for vehicular traffic. For a large portion of the year the river has a very low flow and at such times occupies only a small portion of the flat, rocky river bed. Under these conditions, with the trunk sewers discharging into the river, stagnant pools were formed, sludge deposits accumulated, and stranded sewage solids were in evidence. In the warm summer months the resulting odors, unsightliness and attracted flies caused a public nuisance and a serious menace to the health of the community.

In the spring of 1931 the city inaugurated a combined river clean-up and unemployment relief campaign. The work of removing the accumulated débris and vegetation, leveling the river bottom and trimming the banks, was particularly suited to the employment of considerable hand labor. Three low dams with removable wickets were constructed to provide a body of water from bank to bank in as large a portion of the river as possible. The selection of locations and heights of the dams required careful consideration of the hydraulic requirements of the existing sewerage system to avoid interference with the proper operation of regulators and diversion manholes. The river improvements were made by the forces of existing city departments augmented by the necessary additional labor and equipment.

Type of Treatment Plant

The plant is of the activated sludge type with preliminary settling tanks and separate sludge digestion, and is designed to produce an effluent which can be emptied into the Ottawa River during periods of low stream flow without causing any nuisance. The various units of the plants are as follows:

- Diversion chamber
- Bar screen
- Screenings incinerators
- Grit removal tank
- Preliminary settling tanks
- Sludge pumping station
- Overflow chamber
- Aeration tanks
- Aeration control houses
- Final settling tanks
- Outfall control chamber
- Main building
- Sludge digestion tanks
- Digester control house
- Glass-covered sludge drying beds

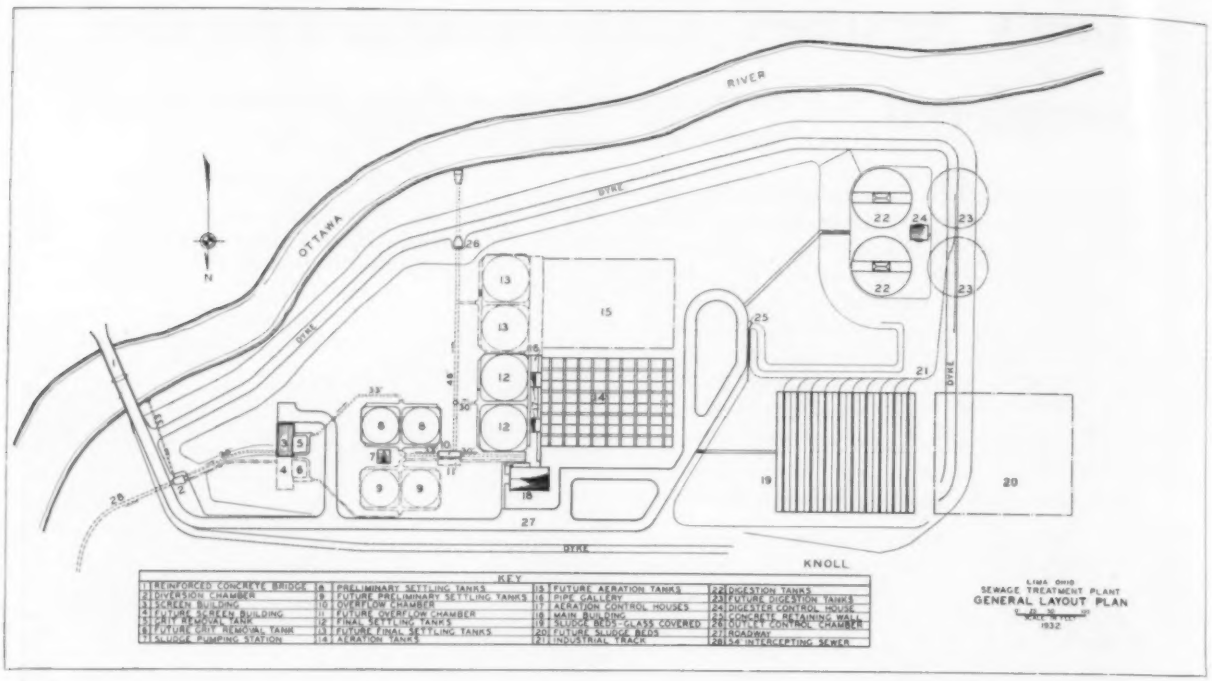
The population of Lima as shown by the 1930 census was 42,217. The treatment plant is designed to care for an estimated 1960 population of 70,000 and an estimated average dry-weather flow of 7 million gallons per day.

The aeration units and final settling tanks are designed

OTTAWA RIVER BEFORE CLEANING
A view downstream from High Street Bridge, showing condition of the river bed

AFTER CLEANING
A view upstream from High Street Bridge, showing the narrow channel previously cut in the rock bed

A WIDE, CLEAN STREAM
Upstream view from High Street Bridge, showing the effect of one of the low dams



for a maximum of 10 mgd with 25 per cent returned sludge, and the screen, grit-removal tank and preliminary settling tanks are designed for a maximum flow of 14 mgd. Digestion capacity of 3.1 cubic feet per capita of estimated population is provided in the separate sludge digestion tanks, and the sludge drying beds are proportioned for 0.5-square foot per capita.

Description of Plant

The plant is located just outside the city boundary line on a relatively low area, and is completely surrounded by a dike to protect the site against flood waters. The area inside the dike comprises 12.4 acres and the plant layout has been arranged so that all the treatment units can be duplicated, thus permitting the plant capacity to be doubled.

At the east end of the site the 54-inch sanitary intercepter terminated. A diversion chamber was built in the dike at this point, with a 30-inch concrete pipe leading into the plant and a 33-inch concrete pipe by-pass to the river. By means of a sluice-gate and overflow weir the flow into the plant can be regulated or, if necessary, the entire sewage flow by-passed to the river.

Screen Building, Incinerator and Grit-Removal Tank

Sewage flows from the diversion chamber into the screen building, and through a mechanically cleaned Dorr bar screen having ¾-inch clear openings. By means of two floats operated by the water level on the upstream and downstream sides of the screen respectively, the cleaning mechanism operates only when the accumulation of screenings causes a predetermined loss of head, through the screen.

Adjacent to the screen, inside the screen building, is a Dorr incinerator having a capacity of 2 cubic feet of screenings per hour, and fired by a combination gas and oil burner which permits the use of fuel oil or gas generated in the digestion tanks or a combination of the two fuels. The incinerator disposes of the floating material removed from the surface of the preliminary settling tanks in addition to the bar screenings.

The arrangement for removing grit consists of a concrete tank 20 feet square and 3 feet deep built adjacent to the screen building, and a raking channel located inside the screen building. As the screened sewage flows across the tank, the particles of grit settle to the bottom and are discharged into the raking channel by means of the scrapers and buckets of a Dorr rotating mechanism. The raking channel is provided with equipment which gradually rolls the grit particles up an inclined slope out of the sewage, washes the organic material back into the tank, and discharges the grit into a storage hopper. The character of the grit removed is such that it can be used as fill material without creating any objectionable odors.

Preliminary Settling Tanks

From the grit-removal tank the sewage flows through a 33-inch concrete conduit into two preliminary settling tanks equipped with Dorr sludge-collecting mechanisms, each tank being 55 feet square and 11 feet 6 inches deep at the edges. Allowing 18 inches freeboard, these tanks provide a detention period of 1½ hours based upon 7 mgd flow. The sewage flows from the bottom of the influent channel into each tank through fourteen 8 x 8-inch submerged ports, and from each tank through eight 12 x 12-inch submerged openings, with adjustable gates, into the effluent channel. This arrangement was adopted to assist in maintaining as high a hydraulic gradient through the plant as possible, and the observed loss of head from the junction of the influent channels to the junction of the effluent channels amounted to only 0.2-foot at 6 mgd flow.

The collecting mechanisms are provided with electrical controls and alarms which function to sound an alarm and shut down the units in event of stalling due to an excessive accumulation of sludge or the formation of ice on the rails.

Sludge Pumping Station

In the sludge pumping station are located two Dorr duplex, variable-stroke, plunger pumps for discharging the preliminary tank sludge to the digestion tanks. The suction piping is arranged so that either pump can draw from either tank, and so that either tank can be emptied without the use of the pumps.

Overflow Chamber

In the effluent line from the preliminary tanks is an overflow chamber having a long overflow weir, a 30-inch valved settled sewage connection leading to the aeration units, and a direct connection into the 48-inch plant effluent line. In normal operation the overflow weir diverts the settled sewage flow in excess of 10 mgd into the plant effluent line, and by closing the 30-inch valve the entire plant flow can be by-passed to the river after receiving preliminary settling.

Aeration Units

The aeration units consist of four two-pass aeration tanks, in which a mixture of settled sewage and activated sludge from the final settling tanks is agitated by means of compressed air introduced at the bottom of the tanks; two final settling tanks for separating the activated sludge from the aeration tank effluent; two control houses for regulating the flows of air and sewage in each tank; and a pipe gallery for housing all the necessary piping, valves, meter tubes and metering equipment.

The aeration tanks are each 31 feet wide, 189 feet, 6 inches long, and 11 feet, 6 inches deep, with a 12-inch interior partition wall dividing the tank into two passes each 15 feet wide and having an effective depth of 10 feet. The tank sizes provide a detention period of 4.7 hours based upon 7 mgd flow with 25 per cent returned sludge.

The two final settling tanks are each 70 feet square, with an effective depth of 10 feet at the sides and a freeboard allowance of 18 inches. The general arrangement of the tanks and of sludge-collecting mechanisms is similar to the preliminary settling tanks, except that the tank effluent flows over adjustable overflow weirs. The settled sludge is drawn from the bottom of each tank separately into a sludge sump, from which it flows to a suction well in the main building, and the major portion is then returned to mix with the settled sewage flowing into the aeration tanks. It is the return of this activated sludge to the aeration tanks which gives the name to the activated sludge process, and which is largely responsible for the high degree of purification obtained in the final effluent. The amount of activated sludge deposited in the final settling tanks, in excess of the requirements for returned sludge, is pumped to the digestion tanks directly, or is resettled in the preliminary settling tanks and then pumped with the preliminary tank sludge.

In each of the aeration control houses are located manometers to indicate the flow of air and mixed sewage in the two aeration tanks, the regulating valves controlling the air supply to the two tanks, and pressure gages indicating the air pressure in the main and branch to each tank.

Digestion Tanks and Control House

The two separate sludge digestion tanks are each 85 feet in diameter and 22 feet deep, provided with a solid roof to permit the collection of the liberated gas, and equipped with Dorr stirring mechanism, and with heating coils to maintain a temperature of tank contents favorable to rapid digestion.

The digester control house consists of a brick superstructure 22 by 26 feet in plan, built on a two-story substructure 27 feet in diameter; it contains the control valves for the raw and digested sludge connections to the digesters, gas meters, gas-fired boiler and circulating

GENERAL VIEW OF THE LIMA, OHIO, SEWAGE TREATMENT PLANT
Taken from the digestion tanks at the southwest corner of the site

pumps for digester heating systems, and provides space necessary for equipment required for future plant expansion.

Sludge Drying Beds

A total of ten sludge drying beds, each 20 x 175 feet, provide 0.5-square foot per capita of design population. The beds have American-Moniger glass covers, and a system of industrial trackage, cars and gasoline locomotive is provided for sludge removal and resanding the beds.

Main Building

The main building has a two-story brick superstructure 32 x 58 feet in plan, housing the offices, laboratory, toilet and locker rooms on the second floor, and the blowers, switchboard and air and sewage meters on the first floor.

Three rotary type positive displacement blowers of Stacey Engineering Co. make are installed, driven by synchronous motors and having capacities of 2,500, 3,750, and 5,000 cubic feet of free air per minute respectively. The guaranteed power input averages 2.25 kw per 100 cubic feet of free air per minute delivery against 5.5 pounds gage pressure.

In the basement are the air filters, steam heating plant, excess sludge pump and four Dayton-Dowd sewage pumps, two for return sludge and and two for plant drainage.

Extensive plantings of trees, shrubs and flower-beds have been made, which add greatly to the appearance of the site and indicate the interest in the plant taken by the City Manager and the members of the City Commission.

Costs and Financing Plant Operation

The total contract cost of the sewage treatment plant was $561,500, including roadways, dikes and concrete bridge, or a cost of $8 per capita of design population.

A sewer rental ordinance was enacted to provide $40,000 per year for the operation of the sewage treatment plant and the collecting system. The charges are based upon the city water-meter readings and the bills for water and sewer service are rendered on the same statement. The established rates are as follows:

Water

$3.00 per quarter, minimum charge, for 500 cubic feet or less.

$0.10 per 100 cubic feet in excess of 500 cubic feet per quarter.

Sewer

$0.80 per quarter, minimum charge, for 500 cubic feet or less.

$0.15 per 1,000 cubic feet in excess of 500 cubic feet per quarter.

H. P. Jones and Co., Toledo, Ohio, prepared the plans and supervised the construction of the treatment plant, and the construction work was done by Green & Sawyer Co., Lima, Ohio. Walter S. O'Brien represented the city during construction, and was then appointed superintendent of sewage treatment. The successful completion of the entire improvement program was due in no small measure to the earnest efforts of Fred C. Becker, City Manager, and the members of the Lima City Commission.

Meters Should Fit the Need—Not the Pipe

Results Obtained in New Rochelle by Applying This Criterion

By **H. G. BROWN, JR.**
Engineer, The New Rochelle Water Co., New York

IN the December, 1931, issue of THE AMERICAN CITY appeared an article which described a method used by The New Rochelle Water Co. for determining the suitability of certain meters for the service they were performing. It is now possible to present some definite results obtained by the application of this method, which it is believed are worth considering.

During the latter part of 1930 and the early part of 1931 twenty meters, varying in size from 1-inch to 2-inch, were selected from a meter book as being oversized. Of these, eleven were replaced by smaller ones at different times as the regular work permitted. The other nine were not changed, for various reasons: in one case the owner objected; in at least two instances a change in size would have necessitated extra work; in two more cases poor pressure complaints had been received; and so on. So, as the whole idea was more or less of an experiment for us at that time, we decided to let these meters wait until we had definitely proved something from the other ones.

Results of One Year

It is a year since the last of the eleven meters which were changed was replaced by a smaller one, so we feel that the results are reasonably reliable. One connection was discontinued shortly after the change was made, thus reducing the number to ten. In Table No. 1 we show, first, the sizes of the original meters and the registrations and corresponding load factors obtained during a period of approximately one year immediately preceding the change; next, the sizes of the replacement meters and their registrations and corresponding load factors obtained

TABLE 1—METERS CHANGED

Original Size	Registration Period	Reg. Cu. Ft.	L. F.	Reduced To	Registration Period	Reg. Cu. Ft.	L. F.	Change in Registration Cu. Ft.	Change in Registration Per Cent
1″	10/ 3/29—10/21/30	28,800	1.9	⅝″	11/21/30—11/20/31	37,700	7.5	+8,900	+31
2″	11/14/29—11/12/30	209,000	4.2	1½″	11/21/30—11/20/31	236,900	7.9	+27,900	+13
2″	11/19/29—11/21/30	87,200	1.7	1″	12/23/30—12/21/31	88,200	5.9	+1,000	+ 1
1″	.....	.....	....	¾″	Account Closed	.....	....	.....	....
2″	3/21/30— 3/20/31	121,600	2.4	1″	4/20/31— 4/20/32	127,300	8.5	+5,700	+ 5
2″	3/21/30— 3/20/31	143,600	2.9	1″	4/20/31— 4/20/32	156,900	10.5	+13,300	+ 9
1″	2/24/30— 2/21/31	50,600	3.4	¾″	3/21/31— 3/22/32	43,900	5.2	—6,700	—13
1″	10/25/29—10/23/30	29,900	2.0	¾″	11/24/30—11/23/31	35,300	4.2	+5,400	+18
1½″	3/21/30— 3/20/31	178,900	6.0	1″	4/20/31— 4/20/32	196,400	13.1	+17,500	+10
1″				¾″					
1″	10/17/29—10/21/30	181,800	6.1	¾″	11/21/30—11/20/31	169,200	10.0	—12,600	— 7

TABLE 2—METERS NOT CHANGED

Size	First Registration Period	Reg. Cu. Ft.	L. F.	Second Registration Period	Reg. Cu. Ft.	L. F.	Change in Registration Cu. Ft.	Change in Registration Per Cent
2"	11/19/29—11/21/30	347,200	6.9	11/21/30—11/20/31	313,100	6.3	—34,000	—10
2"	11/20/29—11/21/30	289,000	5.8	11/21/30—11/20/31	286,200	5.7	—2,800	— 1
2"	11/19/29—11/21/30	306,600	6.1	11/21/30—11/20/31	331,400	6.6	+24,800	+ 8
1½"	11/19/29—11/21/30	182,100	6.1	11/21/30—11/20/31	175,700	5.9	—6,400	— 4
2"	11/19/29—11/21/30	117,300	2.3	11/21/30—11/20/31	119,000	2.4	+1,700	+ 1
1½"	1/24/30— 1/23/31	56,400	1.9	1/23/31— 1/25/32	55,100	1.8	—1,300	— 2
2"	11/19/29—11/21/30	272,300	5.4	11/21/30—11/20/31	198,500	4.0	—73,800	—27
2"	12/20/29—12/20/30	169,600	3.4	12/20/30—12/21/31	129,800	2.6	—39,800	—23
2"	12/20/29—12/20/30	142,500	2.8	12/20/30—12/21/31	143,100	2.9	+600	0

during the year immediately following the change; and, finally, the differences in the registrations for the two years. Because the meters were usually changed between readings, rather than on a regular reading day, there is a lapse of about a month between the end of the first period and the beginning of the second one, so as to keep the two as nearly equal as possible. Even so, many of them are from one to three days longer or shorter than a year, and one is eighteen days longer. A (+) plus sign indicates an increase in registration the second year, while a (—) minus sign indicates a decrease. The last two meters both supply one house, and the combination shows a decrease of 7 per cent; one more case shows a decrease of 13 per cent; but the other seven results show increases of from 1 to 31 per cent.

After obtaining these figures, it occurred to us that possibly there would have been increases even if we had not made the changes, so we compiled similar figures for the nine meters which were not changed. Table No. 2 gives these. As will be seen, there are only two which show increases—one of 1 per cent and one of 8 per cent; one shows practically no change; and the other six show decreases of from 1 to 27 per cent. Seven of these meters have since been replaced with smaller ones.

As mentioned before, many of the periods are longer or shorter than a full year. But if allowances were made for these discrepancies, the changes in registration would vary only about 2 per cent either way in all cases except the first in Table No. 1, in which there would be an increase of possibly 5 to 8 per cent. Therefore we believe that they are sufficiently accurate to indicate the general trend, and to show the benefits to be derived by fitting the meters to the needs rather than to the service pipes.

Waste Disposal by Incineration in Louisville

Two Incinerators and One Dump Care for the Wastes from Households and Business District

By THEODORE REED KENDALL
Engineering Editor, The American City

FOR the purpose of collection and disposal of the household wastes of Louisville, Ky., the city is divided into three districts: the Eastern, which is well divided between residential and business buildings; the Central, which includes the hotel and some residential portions of the city; and the Western, which is quite similar to the Eastern district. Collections of garbage and rubbish are made three times a week the year round, the only variation being that from early November to April a separation of garbage and rubbish from ashes is required. Red tags are attached to the collection cans of the householders announcing the change.

The collection equipment consists of 64 two-horse wagons, 12 trailers and 2 trucks. The wagons have 2½-yard bodies. The ordinance governing collection excludes building material from the collection service, but takes care of all other wastes. The separation mentioned above applies only in the Western and extreme eastern portion of the Eastern district where disposal is by incineration. The remaining parts of the city have mixed collection at all times. The average haul for all three districts, whether to incinerators or to the dump, is about three miles.

The teams for the wagon collection are all hired and include the driver. The city provides the tipper who empties the cans into the wagons. The wagons are all end-dump. In the Eastern district one White truck pulls three Highway trailers, and another White with a side-dump body is used in a section of the Eastern district that is quite hilly, and pulls two of the Highway trailers. In the Western district six of the trailers are pulled by horses. There is one trailer in reserve, and a Mack truck is also held as an extra. The trucks are equipped so that they may be used with snow-plows in winter for removing light snows in the center of the city. As the collection and disposal of garbage is under the direction of the Division of Street Cleaning, the interchange of equipment from the collection of garbage to snow removal is very easy.

It is required that the cans containing the mixed or separated refuse be placed in alleys if there are any in the block being served; if not, they are placed at the curb for collection.

Dumps Serve Good Purpose

Although the disposal of garbage and rubbish on dumps in a city is not generally considered the best method, Louisville has made good use of the method in creating new land in low areas, and in at least one case an old dump has become the site of residential property. At present an old sand and gravel pit working 200 x 400 feet in area and 50 feet deep is being filled. An older one that was filled in like manner has been covered with a 4-foot layer of earth and made into a playground.

The city has been filling for some time and has sufficient area to take care of the requirements of disposal for six years more on a privately owned pit which is 1,800 feet long and 300 feet wide, located on low-lying land which is flooded during high water. This will eventually be built up into a distinct improvement to the city, and

The Incinerators

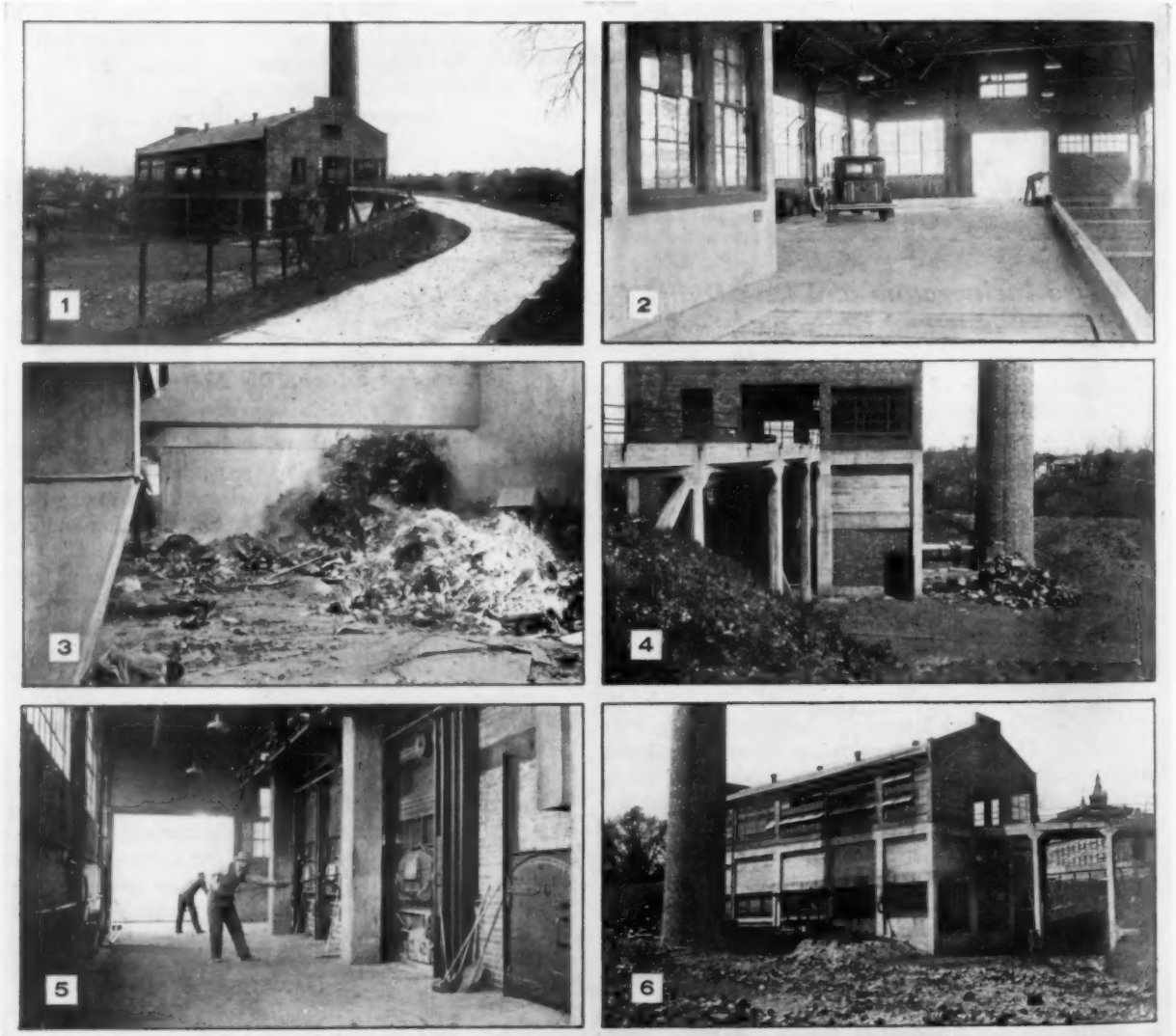
The city has two Heenan incinerators, one in the Western district of 100 tons' capacity in 9 hours' operation, and one of 50 tons' capacity in the same time in the Eastern district. The latter has been built with provision for the installation of a second 50-ton unit when needed.

The Western incinerator has a concrete approach ramp which winds completely around the building to keep the grade low for the loaded wagons, and a short exit ramp of similar construction. A Fairbanks beam scale is provided at the entrance to the dumping floor for the weighing of all loads, so that the capacity of the incinerator is readily determined and the costs easily computed. The wastes are dumped into a long pit at one side of the dumping floor, from which the material is raked by six men below into the charging pits. The building has two units of five furnaces each, with three men per unit for charging.

A small two-cylinder Ingersoll-Rand air compressor provides air for the operation of the pneumatic charging gates, which are controlled by the stokers below. A Buffalo pressure blower run by an electric motor is used to furnish a constant forced draft for the operation of the furnaces. There are two stokers for each unit, and a large combustion chamber for each unit in which a temperature of 1,800 degrees is attained. The fires are pulled or clinkered twice a day and the clinker pulled out onto the floor and wet down and then removed by two wagons.

This incinerator, which is rated at 100 tons in 9 hours, regularly disposes of 110 tons in that time. The cost of collection is about $1.95 per load of 2,300 pounds, and the cost of disposal by incineration at the Western incinerator 88 cents per ton.

The building is equipped with a hot water heater, a separate heating plant, showers, a toilet and an office for the foreman. The Division of Street Cleaning is in charge of H. W. Fledderman, with R. N. Pontrich as assistant.



THE WESTERN INCINERATOR AT LOUISVILLE, KY.

1. The entrance ramp is on fill and a section of concrete bent construction. 2. The dumping floor in mid-afternoon with the platform scales in the foreground and the pit at the right. 3. The pit gradually being emptied in in late afternoon. 4. Close-up of the entrance, showing at the right the dump for large metal containers and the stack. 5. The stoking floor. 6. The exit ramp seen from the clinker and tin-can dump

Paving and Its Maintenance in the City of Washington

MAKING REPAIRS TO THE BITUMINOUS CONCRETE PAVEMENT ON MASSACHUSETTS AVENUE, WASHINGTON, USING THE NEW STYLE SURFACE SUPER-HEATERS

By **F. M. DAVISON**
Engineer of Maintenance, District of Columbia

WASHINGTON, D. C., is a city of approximately 500,000 population. The pavements to be maintained comprise the following:

	Square Yards
Sheet asphalt	3,600,000
Cement concrete	1,700,000
Bituminous concrete	300,000
Bituminous macadam	70,000
Treated waterbound macadam	2,000,000
Granite block	190,000
Asphalt block	450,000
Gravel—treated and untreated	120,000
Low-cost roads (stabilization and mixed-in-place)	96,000
Dirt and cinder	500,000
Total square yards	9,026,000

Concrete Pavement Maintenance

New cracks in concrete pavements are filled by hand, after cleaning the crack with compressed air. The pouring pot should be not more than three-quarters full, so that it can be held close to the crack in pouring, and prevent the filler from spreading over the surface of the roadway proper. In filling old cracks which have had previous applications of filler, more care is necessary to keep the asphalt from running over the edge of the crack. Mastic preparations have been used to a limited extent, as have emulsions. Many of the latter have the drawback of separating in freezing weather.

In repairing breaks in concrete pavements, care must be taken to clean out the hole vertically until a solid subgrade is reached, and horizontally until the edges of the hole are clean, sound and straight. The subgrade should be thoroughly tamped and lightly sprinkled with water before placing new concrete; sprinkling the sides of the hole is also permissible. The concrete for patching should not be dumped directly into the hole, but on an adjacent section of the concrete surface, where it should be turned over several times to correct any segregation that may have occurred; then it is carried to, not thrown into the hole, and tamped enough to bring sufficient mortar to the top for finishing with a wood float. Wet burlap is then placed over the patch for curing.

The District of Columbia has found from experience that the use of commercial concrete, or concrete furnished from a central mixing plant, is highly advantageous as to economy and uniformity of mix. The use of high early strength cement has made possible the expediting of concrete repairs, which has resulted in less inconvenience to traffic. At present our practice in the repairing of concrete pavements is to utilize contract work almost in its entirety, which includes the cutting-out of the original pavement and of work incidental to the placement and finishing of the patch, and we are very well satisfied both as to price and the quality of the work done under the contract system, with the District furnishing inspection at the plant and on the street.

Maintenance of Waterbound and Bituminous Macadam

Patching of pot-holes includes repairing of inequalities in the pavement which are more than 4 inches in diameter and 1 inch deep; any irregularity of smaller dimensions cannot be successfully patched. As a general rule, defects in the pavement smaller than those above mentioned are corrcted later on, using either a penetration patch or an entire coverage of the street with a bituminous surface treatment. The pot-hole is swept as clean as possible, and any loose pieces of aggregate are removed from the sides. Then the hole is painted with cutback asphalt, applied with a swab or with spraying equipment. An accumulation of asphalt should not be left at the bottom of the hole, since this will result in a "fat" spot in the finished patch. The pre-mixed patching material should be thoroughly tamped into the hole, enough material being placed so that the finished grade, after tamping, will be about ¼-inch above the surface of the surrounding pavement. Pot-hole patching comes under the heading of minor repairs, as does edging and straightening; the latter includes pot-hole patching and in addition the repair of the edges of the pavement. All this work is done by hand-tamping the pre-mixed material into place.

Isolated major patching requires the use of a roller and the entire gang, for the placing of both base and surface courses. Typical examples of this type of work are adjustments at bridge approaches, taking out dips in heavily traveled roads, adjustments adjacent to utility cuts, and the repair of washouts. The surface of the old base is lightly scarified to a depth of 2 inches, and then dry slag or stone is placed in layers of not more than 4 inches. The coarse aggregate is then thoroughly choked with screen-

ings, and rolled until solid. As great a thickness of the dry aggregate as necessary may be placed, providing room is left for 2 inches of pre-mixed bituminous base course and 1 inch of topping. The excess choke material should be swept off before the application of the 2-inch base mix, and a light coat of 0.1-gallon per square yard of cutback asphalt applied. There are places where dry aggregate cannot be used, and the road has to be brought to the required section entirely with base mix. In such cases the base mix should not be placed in layers greater than 3 inches thick, thoroughly rolled, and with a heavy coating of dust between the layers. This dust serves as a blotter for excess asphalt, and also prevents shoving.

Resectioning and revamping of the crown is also classed as a major repair, and is performed on old roads carrying heavy or fast traffic. The work includes, in addition to adjusting the crown, the necessary attention to gutters and drainage structures. The edges are first built up with dry slag or stone, and covered with base mix and topping, as described in the previous paragraph. The edges of the topping are feathered out toward the center of the road, so that the center is left bare, and a surface treatment is applied later to meet the feather edges of the patching material. For such shallow resectioning as does not necessitate the use of dry aggregate, bituminous base mix only is used.

Resectioning and rebuilding of a street surface is of course a major repair, and is carried out similarly to the resectioning of the crown described above, except that the entire surface of the road is covered with topping. This topping material consists of a fine-aggregate, cold-mixed, bituminous concrete. Small irregularities in the surface of the topping can be removed after the first passage of the roller by filling them by hand; succeeding passages of the roller then blend them into the surface. It is advisable to keep the roller fairly close to the work of spreading, about 50 or 60 feet. The reason for keeping the roller close to the finished work is that a much smoother and better job can be secured by rolling the material while it is still fresh and the volatile oils are present.

Sheet Asphalt Maintenance

Control of dangerous holes in sheet asphalt is classed as an emergency repair of a temporary nature, designed merely to make the surface safe for traffic. The hole is swept, and if there is water in it a few cinders or some granulated slag may be dumped in and then swept out again to dry it up. Base mix of cold coarse-aggregate bituminous concrete with sufficient ¾-inch material and dust to allow for sealing is used for filling holes of this kind, care being taken to tamp the material firmly into the hole, leaving the finished surface ¼-inch above the surrounding pavement. The repair is then reported, so that final repair may be made as soon as possible. In connection with the final repair of this type of pavement, dependent of course upon the area, the work may be classed more or less as resurfacing, which is sometimes done by the Construction Department and sometimes accomplished by the Maintenance Department. The use of the surface heater on the larger work and the use of the cut-out method on the smaller work is employed. This work is almost entirely done under contract at a stipulated price per square yard or cubic foot, complete in place, and we have found this method, with the District furnishing both the plant and field inspection, to be most satisfactory.

The same principles apply to crack filling in sheet asphalt pavements as in concrete pavements. Emulsions may be used. The best penetration when asphalt is to be used is 85-100. Considerable work has been done with mastics prepared on the job, made with sand and bituminous materials, but the cost of mixing and placing seems to prohibit their wide use, and they do not effect a permanent repair, as lines of cleavage show up in time. The surface heater has also been used for repairing cracks, but its cost is also prohibitive. The best method of all, though the most expensive, comprises cutting out an area of the pavement adjacent to the crack, and filling with sheet asphalt mixture. This makes a permanent repair.

Use of the Surface Heater

The surface heater may be efficiently and economically adapted to the repair of penetration macadam roads, and especially to removing bituminous rolls and fat, skiddy places. Its use is also applicable to sheet asphalt repairs, bituminous repairs, and general resurfacing work on bituminous roads. In removing rolls in the surface, an application of the heater for one to two minutes will soften the surface sufficiently so that the excess material may be pulled off with a garden rake. A light coat of cutback asphalt is then applied, followed by a light application of 3/16-inch slag or stone dust.

The use of the heater for remedying fat places in the surface is the best method so far developed. The heater is applied for one to two minutes, or until the surface has been softened to a depth of about ¾-inch. The surface is then broken with the teeth of a rake, and the loose material removed. This refuse material may be utilized for shoulders in many cases, if used at once, before it becomes brittle. After the top has been removed, the surface is swept with a broom, and all loose material removed; a light coat of 0.1-gallon per square yard of cutback asphalt is applied and broomed into the surface. Cover material of slag or stone is then spread to the desired thickness, which may be as much as 1 inch.

Surface Treatment of Macadam

The first step for initial surface treatments of macadam is the application of the prime, the purpose of which is to penetrate down into the surface of the road, bind the subsurface material together, and stabilize the surface so that the later applications of asphalt may bond to that already placed. This penetration should extend about ¾- to 1½ inches into the old surface. Until recently tars of the grades known as TC1 and TC2 were considered the best bituminous material for this purpose, applied cold at the rate of 0.3- to 0.4-gallon per square yard. There is now on the market, however, an asphaltic material which is equally good for priming purposes; it is an oil prime containing 50 to 60 per cent asphalt of a penetration of 20 or less, cut back with a gas oil and distillate. This prime has a specific viscosity of 8 to 10 at 122 degrees F.

Before the prime coat is applied, the road must be brought to the proper cross-section, for otherwise all irregularities will "photograph" through the finished treatment. A thorough sweeping of the surface must also be carried out, in order to remove loose particles. Roads with a loose-aggregate surface, such as traffic-bound, can be surface-treated, but care must be taken that there is no layer of dust or dirt upon them. The amount of prime material necessary will vary with the type and condition

of the surface, but enough should be used so that thorough penetration is secured and no bituminous material remains on the surface after eight hours' curing. Where possible, it is desirable to keep traffic off the road during the curing of the prime coat. In cases where traffic must use the road, it is necessary to apply a light coat of ⅜- to ¾-inch slag or stone chips at the rate of 8 to 10 pounds per square yard, to keep traffic from picking up the bituminous material. Before the seal coat is applied, this coat of aggregate should be swept off the road; it may be swept back upon the seal coat, provided it has not picked up too much dirt. A power pressure distributor gives better results than hand methods in the application of the bituminous material for the prime coat; the cover material may be spread either mechanically or by hand, but mechanical spreading is preferable.

MAKING A BITUMINOUS CONCRETE PATCH OVER OLD PAVEMENT USING COLD BITUMINOUS CONCRETE

The best material to use for seal coat is a cutback asphalt containing 78 per cent asphalt, with a penetration of 50 to 122 degrees F. and a specific viscosity of 18 to 25 at 122 degrees F. The rate of application should be 0.35- to 0.45-gallon per square yard, applied with a pressure distributor. Hand methods are less satisfactory, and necessitate a great deal of care in brooming the bituminous material evenly over the surface. Cover material should be applied at the rate of 9 pounds of aggregate per 0.1-gallon of bituminous material in the seal coat. The best size of material for cover seems to be ⅜- to 3¾-inch, with a 5 per cent tolerance on the lower limit. The choice of materials depends largely upon availability and price; the use of pea gravel has been practically discontinued in most states and cities. Stone or slag chips where available, are the proper materials to use. In Washington slag is preferred to stone, owing to its absolute freedom from dust, its porosity, its affinity for all bituminous materials, and its light weight. Since a cubic yard of stone slag weighs about 2,000 pounds and a cubic yard of stone about 2,600 pounds, the economy to be effected by the use of slag, if the delivered prices are the same, is evident. Excellent jobs can be secured using stone, but a better non-skid surface, as well as a cheaper one, may be secured by using slag.

The argument has been advanced that owing to the porosity of slag it is necessary to use 8 to 10 per cent more bituminous material, This is true, but it is found that the bitumen impregnates itself into the cells of the slag and there remain latent in its original state, entirely concealed from the oxidizing influence of the air. As the exterior coat of asphalt loses its "life," the asphalt in the slag sends out its life into the deadened covering; consequently the additional percentage of asphalt is entirely justifiable. The specification used in Washington, covering the slag, is as follows: weight not less than 72 pounds per cubic foot; per cent of wear not more than 14.

A surface treatment cannot be rolled too much nor too soon after the cover material has been spread. What little material does break up is not harmful to the treatment, for the breaking or crushing is all in fairly large-sized fragments, and not in pulverized dust. For best results, traffic should be kept off a newly-treated job for at least four hours after the rolling has been completed, in order to give the asphalt time to set up. Traffic on a freshly treated road will kick off approximately 1½ pounds of cover material to the square yard, while after four hours' curing the loss will amount to only ½-pound per square yard.

TYPICAL SCENE IN COURSE OF BITUMINOUS SURFACE TREATMENT OF MACADAM PAVEMENTS

The average surface treatment as outlined above should be good for a life of three years under normal circumstances and a traffic of 2,000 to 5,000 vehicles per day. A surface treatment is merely a protective coat for the base, and, although such a treatment will last four years, it is not advisable to let it wear through, exposing the base to disintegration. It is more economical in the long run to re-treat the road one year before the previous treatment has entirely worn out. It is not necessary to prime-coat the surface in re-treating, and the amount of asphalt applied for seal coat should be smaller than for the original surface treatment, although of the same quality. The cover material

will also be less in quantity.

A surface treatment usually is at its best after it has been in place for six to seven months and traffic has had a chance to iron it out. It may be very easily and cheaply patched, using cutback asphalt and cover material of slag or stone chips, at a cost of about half that of patching with pre-mixed material. After sweeping thoroughly, the area to be patched is painted with asphalt, covered with aggregate, and rolled. Experience has shown that the use of a drag following the placement of the cover material, and prior to the rolling, will give a much smoother and more uniform riding surface.

Surface Treatment of Gravel Roads

While the mileage of gravel roads in the city of Washington is only about 30, considerable successful experimental work has been done in their surface treatment. There are two types of gravel road—those containing considerable clay, about 15 to 20 per cent, and those with a small clay content, 5 per cent or less. The first type may be termed cementitious, the second non-cementitious.

In the surface treatment of the cementitious types, it has been found advisable to remove about ¼-inch of the surface by sweeping, thereby exposing larger aggregate. A prime coat is then applied, using 0.35- to 0.50-gallon per square yard of oil prime described previously under "Surface Treatment of Macadam." Cold tar primes are successfully used in lieu of oil primes on both gravel and macadam roads; however, the difference in price between oil and tar primes is bound to be given consideration. The road is then left closed to traffic for four hours, until the prime coat has cured, and the seal coat is applied. This is the same quality of asphaltic cutback described previously for seal coat, and is used at the rate of 0.36- to 0.44-gallon per square yard, followed by slag or stone cover material, ⅜- to ¾-inch, at the rate of 43 pounds per square yard, dragging and rolling.

Surface treatment of the non-cementitious type of gravel road necessitates first the consolidation of the surface to a depth of 1 to 2 inches, using an asphaltic oil containing 60-70 per cent asphalt at the rate of 0.4-gallon per square yard. After this application of bituminous material, the entire surface is thoroughly disked and manipulated with a grader, and then smoothed and rolled to compaction. About two days should be allowed for this prime coat to cure before the seal coat of cutback asphalt is applied. Using the foregoing materials, we have been able to develop a surface which is extremely satisfactory, both as to durability under considerable volume of traffic, and as to its ability to retain its non-skid qualities.

Maintenance of Dirt Roads by Stabilization

The principles of stabilization of road surfaces are not new, having been developed from macadam and traffic-bound methods, but some changes have been necessary in applying them to city work. Loose-aggregate, traffic-bound roads cause a dust nuisance, and in addition the practice of windrowing the aggregate at the sides of the road is unsatisfactory owing to pilfering of material for the construction of private driveways by property owners. The time required for compaction of such a surface also offers an obstacle in the minds of city taxpayers. Since most of the dirt roads in the District of Columbia are in new real estate developments, an effort is made to build a more or less permanent surface that will cost no more than the amount formerly spent on maintenance of the dirt roads.

The first decision to be made was the type of aggregate. Blast furnace slag was finally chosen, first, because it compacts readily into a firm surface, and second, because a ton of slag would go farther than a ton of stone or gravel. From a ton of stone we secure 21.3 cubic feet of material at a unit delivered cost of 8.92 cents, while from 1 ton of slag we secured 27 cubic feet of material at a unit delivered cost of 7.59 cents, affording a direct saving of 1.33 cents per cubic foot of aggregate used. Stone is equally well suited for the work, except that good results cannot be obtained with crusher-run material.

The following revised specifications have been followed in constructing these "Slag-tite" surfaces:

Stabilization

1. Prepare the subgrade to the desired section, preferably 18 feet wide, with a crown of ½- to 1 inch. A one-man grader will do the job very well.
2. With a disc cutting harrow cut or disc the prepared subgrade to a depth of 2½ inches, being sure that there are no large lumps of clay or loam.
3. With a grading machine, pull the loose material to the sides of the road, forming windrows.
4. Spread upon the subgrade 1 inch loose of 3/16—0 slag dust.—The inverted choke.
5. Spread upon the choke 4 inches loose ¾—⅜ slag.
6. Cover with from 1 to 1½ inches slag dust 3/16 to 0.
7. With disc harrow, thoroughly mix the material back and forth, and as the disking is going on, cast into the loose material from the windrowed material at the sides sufficient clay or dirt to advance the binding.
8. Water the loose material thoroughly, but do not attempt to puddle it.
9. Roll thoroughly with a 10- or 12-ton, 3-wheel roller, and if binding or consolidation does not begin at once, apply equal parts of slag dust (3/16-inch to 0) and clay from the sides of the road until the road is thoroughly bonded.
10. Allow road to dry out; sweep free from top dirt and dust, and apply prime and seal coat.

This type of work is good for 750 vehicles per day, with weights up to and including 5 tons gross. Washington has 5 miles of this type which have been under service for more than 18 months, and are proving very satisfactory. This method of construction makes use of the "inverted choke." Under the roller the bottom layer of dust comes up and meets the top layer coming down, and effects a thorough choking.

As traffic increases, as it naturally will over an improved road, an additional treatment may need to be given as follows: The grader is used to pull from the shoulders sufficient earth to cover the road to a depth of 1 inch, and upon this is spread 1 inch of slag chips, ⅜- to ¾-inch. This is watered and rolled. We have found it necessary to do this on only one section of road, the remainder having stoop up splendidly after a year's traffic. However, it is advisable after a year's traffic to surface-treat those roads with cutback asphalt and slag chips. We have used either petroleum or Trinidad asphalt for this purpose, in two treatments of 1/3-gallon per square yard each, with a covering of 20 to 25 pounds of slag chips per square yard for each application.

The finished road will present a base 4 to 5½ inches thick, with a seal coat ¾-inch thick, and will carry 1,200 to 1,800 vehicles of ordinary traffic per day very satisfactorily.

Dust Palliatives

The dust nuisance may be controlled by any one of three methods—water sprinkling, calcium chloride, or petroleum oil. Water sprinkling is a very poor remedy, being quite expensive for the good accomplished. The application of calcium chloride offers one of the best and cheapest methods of controlling dust. When applied at the rate of about 1¾ pounds the cost is 2.0 to 2.5 cents per square yard. Any greater amount is wasted material, and any less is likely to be ineffective. As a general rule, three applications per season are necessary to obtain good results, although this depends on the frequency of rainfall; rain immediately following a treatment will usually render it ineffective. The use of petroleum oil, known under U. S. Government Master Specifications as "OC-2," is perhaps the best, most lasting, and cheapest method of dust control when applied at the rate of 1/3-gallon per square yard from a power distributor. It can be applied on any type of surface, loose or compact, and is not seriously affected by rainfall; the average life of a treatment is about three months. Roads that have been treated with this oil have in effect received a prime coat, so that in later surface treatments the prime coat may be omitted. This oil, however, is not recommended as prime coat material for regular surface treatment work, since it contains a greasy element which must wear off before the seal coat can be applied.

Ice Removal from Streets

Calcium chloride, though rather expensive, may be used very successfully for removing ice from city streets. It takes approximately 3 pounds per square yard per inch depth of ice, applied in two placements of 1½ pounds each, and allowing time for the first to penetrate before the second is applied. In removing ice from asphalt streets, the surface must be flushed with a pressure hose as soon as the ice has been loosened, in order that the calcium chloride may not injure the asphalt surface. A very satisfactory method of applying calcium chloride consists of saturating cinders or granulated slag in a calcium chloride solution, then spreading the aggregate on the street. The solution eats away the ice, allowing the pieces of aggregate to become embedded where they cannot be kicked out by traffic.

ACKNOWLEDGMENT.—Presented as a portion of the Report of the Committee on Maintenance of the American Road Builders' Association.

How Humboldt Met the Unemployment Issue

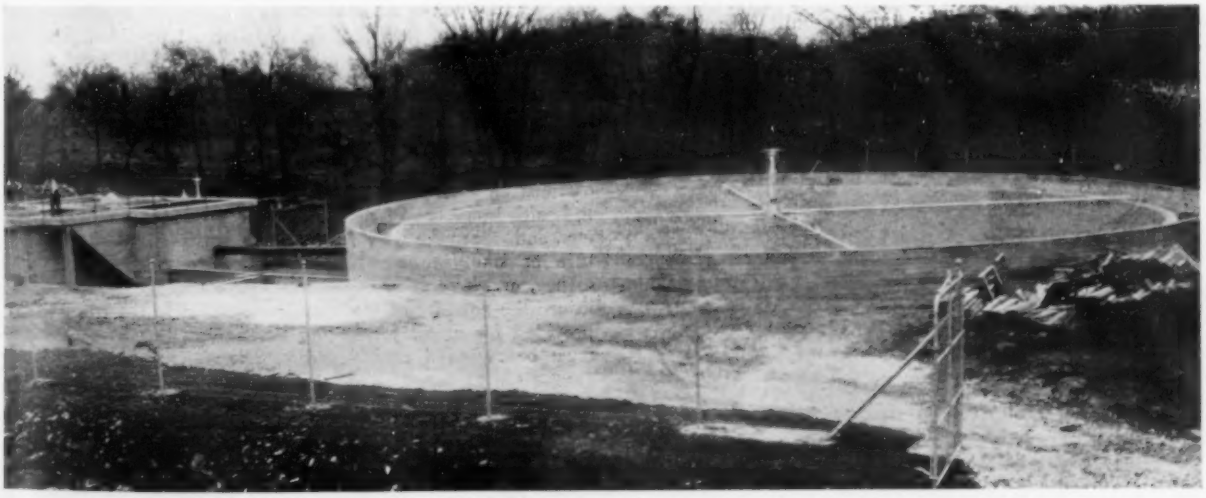
By THOMAS S. RAILSBACK
Assistant to Mayor,
Humboldt, Kans.

IN the early fall of 1931 the city of Humboldt was confronted with two serious problems: first, its lack of facilities for adequately caring for local unemployed; and, second, an obsolete, expensive and unsatisfactory method of sewage disposal. The city administration decided that the second problem could solve the first, so an up-to-date sewage disposal plant was built to take care of the unemployed during the winter of 1931-1932.

Organization

An engineer whose previous record assured a thorough understanding of the subject of disposal plants was consulted. Upon acceptance of the plans and preliminary etsimates submitted by him, the city issued bonds to cover the estimated cost of construction. The bonds were eagerly purchased by the citizens of Humboldt and its immediate environs. Only Humboldt labor was used and, in order to give each individual the maximum of time, the crews were changed weekly.

Before work was started, every man seeking employment was asked to register on cards provided by the city. The type of card used, when properly filled out, gave the information generally required from an applicant for work on any public project. The cards were then filed in chronological order. Each man was numbered according to his position on the registration index, and they



THE 109-FOOT DIAMETER ADAMS-CRESSETT SEWAGE DISTRIBUTOR AT HUMBOLDT, KANSAS
The bed for this was the first unit to be built in the city's unemployment program

were called for work in that order. This rule was deviated from only for some deserving individual with an unusually large family and in unusually straightened circumstances. In such cases the man was advanced on the index, replacing some man in slightly better circumstances and with no family. In this way an effort was made to keep the distribution of work as equitable as possible at all times. That this was a task requiring no little effort is shown by the fact that during the period of 5 months, 462 men were given employment in crews of from 10 to 25. These men were paid from 30 cents to 90 cents per hour according to the class of work performed; and were repeated according to the cycle of the index.

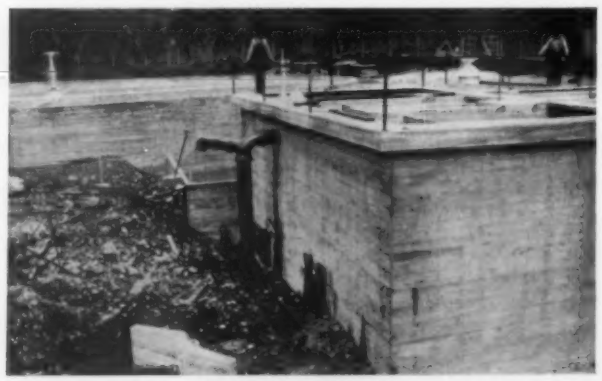
The New Sewage Treatment Plant

At 8 o'clock in the morning of October 20, 1931, the first shovelful of earth was turned by the Mayor, and the excavation for the new plant was under way. Fortunately, an ideal site for the plant was located near the river, with natural drainage facilities making it unnecessary to use pumps in handling either the raw sewage or the plant effluent. The design of the plant required the construction of two separate large units connected by three shallow tanks used for sludge drying. The first, in order of construction, was the distributor bed, a large double circle of concrete walls, one 5 feet inside the other, the outside wall being 9 inches thick, 8 feet high and 386 feet in circumference. The inner wall also was 9 inches thick, but only 6 feet high, and was 358 feet in circumference. Bisecting this great circle through the 12-inch slab of concrete that forms the floor is a concrete trough with a flow-line falling 18 inches in the diameter of the circle. The fall is in the direction of the other unit, the Imhoff tank. The inner circle of the distributor bed is filled flush with the lower wall with crushed rock of the hardest type obtainable, to minimize the moisture absorption and thus mitigate deterioration from freezing and thawing. This rock is filled in over rows of 6-inch split tile laid across the concrete floor from the outside of the inner wall to the trough, which is covered with a cast iron grating.

At the center of the distributor bed is mounted an Adams-Cressett type distributor with four arms. Each arm reaches across the rock to the inside of the inner wall.

The second unit, a standard Imhoff tank, also has an Adams air-locking dosing syphon, a re-settling tank and a 4-inch sludge pump. This tank is built of reinforced concrete, of 26-foot depth below the surface grade. In excavating for this tank much trouble was met, which cost 45 days' extra labor at an average per diem cost of $60. This difficulty ultimately made it necessary to change the design of the tank, adding 10 tons more of reinforcing steel and more concrete than originally planned. What appeared in the preliminary survey to be only a shallow vein of rock proved in reality to be a ledge of hard, blue limestone ranging from 15 to 18 feet thick. It ran out at the bottom into a loose shale or soapstone.

The distributor bed and the Imhoff tank are connected by a series of three sludge drying beds built of reinforced concrete. The walls of the sludge beds stand 4 feet high, and the beds are filled to a depth of 20 inches with loose rock and sand over a concrete floor, which is graded to drain into the effluent of the Imhoff tank. The influent is handled by a 12-inch cast iron pipe that taps the raw sewage line at a point adjacent to the old septic tank.



THE IMHOFF TANK
Twelve feet above and 26 feet below ground level.
A product of needy labor.

Cost

The entire cost of this project was a trifle over $33,000, every cent of the bond issue for which was raised in the neighborhood of Humboldt, and $17,000 was spent in and around Humboldt for labor and materials. The labor item amounted to $13,000, which went to the otherwise unemployed for work which was, in most cases, well and faithfully performed. The total cost of the plant was slightly reduced by the re-sale of three carloads of second-hand lumber which was purchased for use in concrete forms. This brought about a return of about $1,000.

The work was carried on under the direction of B. A. Donaldson, Superintendent, and U. W. Johnson, Resident Engineer.

England's New Town and Country Planning Act

MUNICIPAL and town planning journals in England are rejoicing over the adoption by Parliament of the Town and Country Planning Act of 1932. Although the measure in its final form is not so broad and liberal in scope as the original draft, the act is regarded as an important step forward. It not only increases in some respects control over urban areas, but gives important new powers of country and regional planning. The *Journal of the Town Planning Institute* for July points out that "there is no longer any limitation as to the kind of land that can be planned provided that the expediency of planning it can be demonstrated."

Two features of the new act of special interest to readers of THE AMERICAN CITY are thus summarized in the *Journal*:

"A planning authority is now entitled, by a process of orders without incurring compensation, to prevent building operations on land where they would involve danger or injury to health by reason of the lack of roads, sewers, water supply, etc., and where the provision of such services would be premature or likely to involve excessive expenditure of public money, or where such operations would be likely seriously to injure the amenity of the locality. Appeal to the Minister is provided for at all times, and a temporarily restricted area must be reviewed every third year. . . . .

"Section 21 increases the amount of betterment recoverable from 50 per cent to 75 per cent. On the other hand, provision is made that, except as a set-off against compensation, betterment cannot be recovered until the property is disposed of or the use changed, that is, in effect until betterment is realized. Change of use does not apply to different forms of agriculture."

Police Salaries and Employment Conditions

SALARIES for the various grades of policemen, from patrolman to chief, averaged by population groups of cities; methods of selection, training and promotion; conditions of employment; and relief funds and pension system, for police departments in 245 cities of over 30,000 population in the United States and Canada, are given in the accompanying tables, compiled by David Wolff for publication in the Statistical Series of the Municipal Administration Service. They are contained in a bulletin* just published as the seventh of the series; it includes the same data for each city, and also the size of the police force. The data were secured from police officials in the 232 cities of the United States and 13 of Canada replying, out of a total of 332.

TABLE IV—SUMMARY BY POPULATION GROUPS—SALARIES OF POLICE PERSONNEL

Population Group	30,000 to 50,000		50,000 to 100,000		100,000 to 250,000		250,000 to 500,000		500,000 to 1,000,000	
Number Reporting	85		80		46		18		9	
Classification	No. of Cities	Aver. Salary	No. of Cities	Aver. Salary	No. of Cities	Aver. Salary	No. of Cities	Aver. Salary	No. of Cities	Aver. Salary
Chief	85	$2923	80	$3467	46	$3980	18	$4796	8	$6607
Deputy Chief	23	2256	28	2831	25	3127	10	3548	8	4495
Inspector	15	2282	21	2677	11	2651	12	2968	8	3918
Captain	66	2317	62	2538	43	2648	18	2646	8	3470
Lieutenant	68	2284	53	2354	32	2438	16	2351	7	2819
Sergeant	79	2037	75	2295	45	2193	17	2140	8	2546
Detective	64	1979	72	2064	40	2095	17	2123	7	2398
Patrolmen	85		80		48		18		9	
Minimum		1705		1728		1729		1703		1860
Maximum		1853		1906		1991		1959		2252

TABLE VI—SUMMARY BY POPULATION GROUPS—METHODS OF SELECTION, TRAINING AND PROMOTION

Size of Cities	Total No.	Number Reporting	Civil Service		Probation				Method of Promotion				Provisions for Training	
			Yes	No	3 mos.	6 mos.	12 mos.	Over 12 mos.	None	C.S. Ex.	Appl.	None	Exam.	Yes	No
30,000-50,000	117[c]	85[b]	59	24	17	37	6	6	19	36	27	15	1	39	44
50,000-100,000	103[a]	80[a]	49	31	16	25	14	6	21	30	13	12	5	48	32
100,000-250,000	58[a]	48[a]	38	10	13	20	6	3	5	30	13	3	1	27	21
250,000-500,000	24	18	17	1	4	11	2	1	..	12	6	..	..	14	4
Over 500,000	14[a]	13[c]	10	4	2	9	1	1	1	12	1	..	1	13	1
Percentage	100.00	79.74	70.6	28.6	21.02	40.81	11.83	6.97	18.77	48.97	32.65	12.24	2.45	57.55	41.63

[a] Includes 3 Canadian Cities.
[b] Includes 4 Canadian Cities.
[c] Includes 2 Canadian Cities.
[d] Includes 2 Canadian Cities.
[e] 2 answers inapplicable.
[f] 1 answer inapplicable.
[g] 0 answers inapplicable.
[h] 1 answer inapplicable.

TABLE VIII—SUMMARY BY POPULATION GROUPS—CONDITIONS OF EMPLOYMENT

Size of Cities			30,000 to 50,000	50,000 to 100,000	100,000 to 250,000	250,000 to 500,000	500,000 and Up	Total	Per cent
Average No. of Hours on Duty Daily		8	57	66	44	18	12	197	80.7
		9	7	6	2	0	0	15	6.2
		10	12	4	1	0	1	18	7.4
		11	3	0	0	0	0	3	1.2
		12	6	3	1	0	1	11	4.5
Average No. of Days on Duty Weekly		6	28	31	21	10	8	98	40
		6½	26	15	9	2	3	55	22.5
		7	28	33	18	6	3	88	35.9
		Indef.	3	1	0	0	0	4	1.6
No. of Days Allowed off With Pay Per Annum	Vacation	Below 10	6	2	2	1	0	11	4.5
		10-12	32	33	3	2	2	32	13.2
		14-15	64	55	28	14	8	179	73.7
		Above 15	1	9	5	1	3	21	8.6
	Sick Leave Unlimited		21	41	20	4	10	106	43.3
	Sick Leave Limited	Below 30	19	16	8	4	1	48	19.6
		30-60	11	9	10	2	1	33	13.5
		Above 60	4	2	5	3	1	15	6.1
		None	18	12	4	5	1	40	16.3
		Indef.	2	0	1	0	0	3	1.2
Annual Clothing Allowance		Uniforms and Equipment	2	0	2	0	1	5	2
		Uniforms	6	11	7	0	3	27	11
		Equipment	3	0	1	0	0	4	1.6
		Other[1]	6	4	0	0	0	10	4.1
		None	63	57	31	16	8	175	71.4
Reimbursement for Damage to Clothing		Full	17	27	16	4	6	70	28.7
		As allowed	4	6	3	0	3	16	6.6
		Repaired	3	1	1	0	1	4	1.6
		None	63	46	27	14	4	154	63.1
Regards for Valor		Commendation or Citation	7	14	21	5	10	57	23.3
		Salary Increase	1	1	0	0	2	4	1.7
		Promotion	1	4	1	0	0	6	2.4
		Vacation	1	3	3	0	0	7	2.9
		None	73	58	23	13	2	171	69.7

[1] Includes Caps, Raincoats, etc.

TABLE X—SUMMARY BY POPULATION GROUPS—RETIREMENT AND RELIEF PROVISIONS

Population Groups			30,000-50,000	50,000-100,000	100,000-250,000	250,000-500,000	Over 500,000	Total	Per cent
No. of Cities Reporting			85	80	46	18	14	243	Per cent
Relief Fund		Yes	37	51	39	15	11	153	62.4
		No Dues Paid	9	12	6	2	2	31	12.7
		No	48	29	9	3	3	92	37.6
Pension System		Yes	69	68	47	17	14	215	87.7
		No Dues Paid	24	25	11	2	0	62	25.3
		No	16	13	1	1	0	30	12.3
Retirement Age (years)		70	2	4	2	0	0	8	3.3
		65	4	6	8	1	1	20	8.2
		60	7	7	6	2	1	23	9.4
		55	3	7	2	0	0	12	4.9
		50	13	10	7	3	2	35	14.2
		No Specific Requirement Stated	36	45	20	11	9	142	57.9
Service Required (years)		30	2	1	2	4	1	10	26.5
		25	13	23	15	3	4	57	23.2
		22	7	6	2	1	0	16	6.5
		20	40	29	26	8	6	109	44.4
		No Specific Requirement	22	21	2	3	1	48	19.6

* "Salaries and Conditions of Employment of Police Forces in 245 Cities in the United States and Canada," Municipal Administration Service, 309 East 34th Street, New York. 35c.

Constructive Effort, Not Destructive Criticism, for Local Goverments

"I REALIZE that most of our local governments are spending greatly in excess of their incomes; but I know very few private individuals who, on the basis of any accurate accounting, have not been doing the same thing for the past three years or longer. I realize that our local governments are struggling under the burden of accumulated debts; but I am able to find very few individuals or private businesses which are not in the same condition. I realize that these local governments during past years of prosperity spent money lavishly and wastefully; it would be a commonplace to observe that most people of Chicago and other cities throughout this period spent their money in the same way; and if our local governments throughout this period overestimated their future incomes and resources, it would be difficult to find a private business which has not done the same thing.

"I realize that there has been much political intrigue, much concealment and outright misrepresentation with regard to the handling of public funds and the expenditure of public moneys; but I find it scarcely possible to pick up a daily paper that does not contain the account of some private corporation whose financial dealing have been concealed from its stockholders, manipulated for the benefit of some inside group, or subjected to misrepresentation in one form or another.

"I realize—to be perfectly frank—that local governments have been permeated with dishonesty, with corrupt politics, with crooked and racketeering practices; but the fact is, likewise, that there are few fields of business left in our larger cities in which some form of racket or racketeering practice has not developed within the past decade.

"Our governmental situation, in short, is only part and parcel of a general condition—business, financial, social, and intellectual—that has been developing for years past. Under these conditions our governmental situation would indeed have been peculiar if it had been much different from what it is; and the sooner we recognize this fact and face it, the more likely we are to make headway in overcoming it.

"But the remedy does not consist in any mere reduction of taxes. Periods of hard times always bring movements of protest, followed by some concession to the demand for lower taxes. But our past experience has been that such relief is always temporary and disappears with the depression.

"This kind of relief to taxpayers is much like the hot coffee and sandwiches that are handed out to the bread lines in periods of hard times. In other words, however pressing the need for immediate relief may be, the real objective of intelligent effort in our present situation must be to develop constructive steps toward a type of local government which will make such situations impossible."

—From an article on "'Reconstruction' for Distressed Cities," by Professor Herbert D. Simpson, Institute for Economic Research, Northwestern University, in the July, 1932, issue of *Commerce* (Chicago).

FORWARD STEPS

Reported by
Municipal Officials, Chamber of Commerce Executives, and Others

City Dump Transformed Into Recreation Center

DES MOINES, IOWA.—Converting the city's waste matter into useful and attractive land is the interesting and profitable experiment attempted by the municipal government of Des Moines, Iowa's metropolis and capital.

Some years ago, for convenience, the dump at Des Moines was located along the banks of the Raccoon River at the place where it joined the Des Moines River. At that time the surrounding land was low, boggy and frequently flooded by the rivers. To fill in this land and reclaim it, if possible, became the task of the city officials. The channel of the Raccoon River was straightened and more than 37 acres of good land have been made available.

A year ago some patriotic citizens saw the possibility of this place's becoming a beautiful addition to the city's assets. The City Council and the American Legion have cooperated in developing the east section as a recreation center and park. The north boundary is now fenced in.

From 80 to 200 truck loads of refuse are hauled daily to the city dump. There is everything from paper and feathers to steel waste and auto bodies. One may get an idea of the extravagance which exists even in these difficult times by seeing what is salvaged by scores of people who scratch a living there.

The dump boss must distribute the loads according to their contents, in order to be constantly making solid ground, otherwise the heavy wagons and trucks would sink to the hubs and be difficult to move. The loads that consist of stone, brickbats and heavy dirt are dumped over the perishable matter and help to make a solid filling. Tin cans, steel drums, metal and the like are welcomed but must nevertheless be covered. Cinders and coarse ashes are saved for top covering and later filling. As the rubbish decays, the ground sinks and then more cinders must be dumped into the hole. The level of the dump has been raised approximately 30 feet above water.

Fire, either in the open or underground, is another difficulty that is frequently being met and overcome.

LUTHER H. SMITH.

Rock Garden Constructed in Community Park

MANSFIELD, OHIO.—Johns Park, in the northwest part of this city, is a community park that is being beautified at the present time.

The Johns Park Association held its annual strawberry festival on June 22 and at that time the newly constructed rock garden was dedicated. The rock garden proper covers an area of approximately 7,500 square feet and was constructed on level ground. Mounds were built to create hills and valleys through which gravel paths wind.

On the west side a four-foot sandstone wall was built from which water splashes down over the rocks into the pool below, and behind this waterfall evergreens were used as a background, making a very pretty setting. The pool is large enough to accommodate a number of water lilies very nicely besides other aquatic plants and forty to fifty large goldfish. An overflow from the pool empties into a stream which winds through the garden, at one point under a rustic bridge and at another over a dam below which there is a miniature mill with a water wheel.

Other features are a paved terrace with a rustic bench, a bird bath, and a sun dial. There are hundreds upon hundreds of rock plants besides many varieties of evergreens, especially junipers.

At the present time plans are being worked out whereby the rock garden may be floodlighted at night.

The labor on this project was all donated by members of the Johns Park Association, but most of the material was bought. The garden was designed and construction supervised by the undersigned.

After sufficient time for further development of plants, the new rock garden will attain added beauty for future seasons.

CLARENCE G. SILCOTT,
Assistant City Engineer and Landscape Architect.

JOHNS PARK ROCK GARDEN, MANSFIELD, OHIO

A Year-Round Playground for Young and Old

MIAMI BEACH, FLA.—Flamingo Park, consisting of 33½ acres of land in the center of Miami Beach, is being made into a model recreation center. A program of landscaping, under the direction of Engineer Neff, has transformed this area from a bare playground into a showplace of tropical beauty. Almost every form of sport and entertainment is provided in the park; and day and night, summer and winter, literally hundreds of people, old and young, will be found at play.

An activity that has attracted nationwide attention is the intra-mural sport program conducted after school for every boy and girl from the third grade through the twelfth grade of school. Organized leagues in soccer, basketball, football, field hockey, Newcomb, volleyball, speed-ball, tennis, are under the supervision of a highly trained staff of men and women. Suitable awards are given to members of the winning teams, and grades are given each boy and girl monthly.

For adults during the winter season horseshoes, shuffleboard, checkers, chess and croquet are provided; and volleyball, tennis, code-ball and exercise classes are furnished for those who want more strenuous exercise.

The ball field draws thousands of spectators to nightly games. A modern comfort station with lockers and shower rooms has been built adjacent to this field. Among other play areas put into operation within the last year or so are bowling greens and additional croquet courts; also three tennis courts, making a total of ten public courts now in use.

Owing to public economy, the appropriation for nightly entertainment programs in the park's amphitheater has been cut out; but regular R.C.A. theater sound equipment is being used, and radio and musical programs are given there during the season every evening of the

week except Sunday. All recreation areas in Flamingo Park are brilliantly lighted for night use.

One of the most unique features of the whole Recreation Department program, carried on throughout the city as well as in the park, is the free kindergarten class, which has an experienced teacher in charge to give instruction in handcraft work and to conduct story-telling.

Figures of the Miami Beach Recreation Department show that it has grown steadily since its organization in 1927.

J. B. LEMON,
Superintendent of Recreation.

Old Contract Keeps Railroad Shops in City

BUCYRUS, OHIO.—A railroad company has been enjoined from moving its shops away from this city, in a decision handed down by an Ohio district appellate court. Moreover, the decision declares that the railroad company must "fully man and operate" the shops, until further notice of the court, "for the sole construction and principal repair shop and roundhouse" of and for its branch railroad between Toledo and Thurston, and "to keep said property in repair."

The suit involves a pledge made fifty years ago by the Toledo & Ohio Central Railroad, now owned by the New York Central Railroad, and followed announcement of the company more than a year ago that it expected to move a major part of the shops to Collinwood, in Cleveland, as a measure of economy.

A deed was discovered, stipulating that if the company ever moved its shops from the town, all the land, buildings, machinery and equipment would revert to the city. The old deed carried with it a contract, made fifty years ago, when the town floated a bond issue of $50,000 to bring the shops there. It was stated for the company that none of the officials seemed to know about the reversion clause, a fire in Toledo in 1888 having destroyed valuable papers.

The company again announced its intention of moving the major portion of its shops. It was successful in having the case transferred to the Federal District Court in Cleveland. Charles F. Schaber, the City Solicitor, went to Cleveland and succeeded in bringing the case back to the county's jurisdiction.

The decision of the Court of Appeals upheld the contentions not only of Schaber, but also of Judge C. U. Ahl, of the County Common Pleas Court, who issued a permanent injunction against removal of the shops from the city. While the Court of Appeals held that delivery of the deed to the Toledo & Ohio Central Railroad and the payment of $50,000 was contrary to law, it declared them to be incidental to the object of the contract, the legality of which the Court upheld.

It is estimated that removal from the city of the heavy parts department of the shops, leaving the terminal and unclassified repair shops still in the city, would have taken away work employing in normal times several hundred men.

ARTHUR WELLER.

Street Signs of Sound Design

MANY miles of streets are paved and repaved each year in Philadelphia. Approval of the Art Jury is essential to the final acceptance of the design for the street designation signs and their supporting standards which are a part of all such improvements. The sign shown in the photograph was selected by the Art Jury from a number of designs submitted, and approved after various modifications, including the removal of all ornament, such as a clumsy palm leaf motif from the connecting panel, and the substitution of the simple urn finial for the commonplace type proposed.

Since the approval of this design somewhat over two years ago, about 1,200 standards and signs similar to the one photographed have been erected throughout the city. The signs and standards are furnished by the Baily-Davis Corporation, of Philadelphia. Where existing utility poles make it inexpedient to place another standard, signs such as that shown in the sketch are attached to the existing poles.

Recent City Manager Appointments

HOLLIS CRAFT, city clerk of Kinsley, Kansas, was appointed city manager of Kinsley, in July. Miss V. I. Milner had resigned that position prior to the spring election.

Albert V. Goeddel, city purchasing agent in San Diego, Calif., was appointed city manager of that city late in July, succeeding H. H. Esselstyn.

John Higgins, former general manager of the Midland Valley Railroad, has been named city manager of Muskogee, Okla., to succeed Ed K. Brook, who had served for two years.

C. Sophus Johnson was appointed city manager of Grand Rapids, Mich., on August 2. George W. Welsh, who had been manager since 1929, had resigned to enter the race for governor of Michigan.

J. B. McLendon, city commissioner, was selected as city manager of Duncan, Okla., on August 15, succeeding W. H. Hollingsworth.

A. L. Meisel, city engineer, became the first city manager of Williamsburg, Va., in July.

J. H. Clark, a building inspector in Compton, Calif., was appointed city manager in July, to succeed A. B. Gidley, who had been manager for four years.

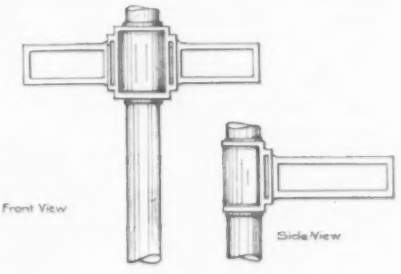
John W. Suggett, former city clerk of Woodward, Okla., was promoted to the city managership of that city on July 1, when H. M. Renner resigned.

Charles S. Thrasher was appointed city manager of Daytona Beach, Fla., in August, succeeding M. S. Couch, who had held that position since January.

W. Morgan Works, a bookkeeper, was recently appointed city manager of Sherman, Texas. He succeeds O. J. S. Ellingson, who had been city manager of Sherman since 1916.

CLARENCE E. RIDLEY,
Executive Director, The International City Managers' Association.

STREET SIGN AND STANDARD IN PHILADELPHIA, PA.



DESIGNATION SIGN
This is for attaching to existing poles

Stockholm Planning Competition Open to Americans

THE city of Stockholm, Sweden, through its Town Planning Board, extends to American city planners an invitation to take part in an international competition for the replanning of that part of the city known as Lower Norrmalm. As the greater part of this section of Stockholm still conforms with the town plan drawn up in the middle of the 17th century, the streets are too narrow and the open spaces inadequate for modern needs. Very interesting and important problems of replanning are therefore presented.

Through the courtesy of Dr. Albert Lilienberg, Town Planning Director of Stockholm, THE AMERICAN CITY has received a copy of the program of the competition and a complete set of maps, plans, aerial photographs and other data which contestants would require. This material has been turned over to the office of the American City Planning Institute, 130 East 22d Street, New York, where it may be consulted by members of the Institute and others interested in the competition.

Three substantial prizes are offered—a first prize of 20,000 kr. (about $5,400), a second prize of 15,000 kr., and a third prize of 10,000 kr. The closing date for entry is March 1, 1933.

TRAFFIC CONTROL AND FACILITATION

Conducted by Publications Committee, Institute of Traffic Engineers, 175 Fifth Ave., New York

Maxwell Halsey, Chairman, Hawley S. Simpson, Harry H. Hemmings, Arthur G. Straetz, I. S. Shattuck, P. J. Stupka, Donald M. McNeil

Speed Detector Developed by Eno Foundation

DEVELOPMENT of a simple "speed detector" by Professor C. J. Tilden of Yale University and the Eno Foundation for Highway Traffic Regulation is announced in Bulletin No. 88 of the Connecticut Department of Motor Vehicles.

The device consists of an L-shaped box, painted black and equipped with a reflecting mirror set at an angle of 45 degrees to the sides of the box, as illustrated in Figure 1. While simple in construction and operation, it gives results well within the limits of accuracy needed.

In use the speed detector is mounted on a camera tripod a few feet from the pavement (Figure 2). One of the open ends of the box points directly across the road while the other is directed toward an observer stationed some distance away. Looking parallel to the road into the mirror the observer notices a distinct flash or flicker as a car passes opposite the detector. At the instant of the flash he presses the starting button on a stopwatch. The watch is stopped when the car passes the point at which the observer is stationed.

A distance of 176 feet between the detector and the observer is recommended because at this distance the time, in seconds, required for the passing car to travel from the detector to the observer, when divided into the number 120, gives the speed of the car in miles per hour.

The bulletin includes a review of the results of speed observations at two points on Connecticut highways.

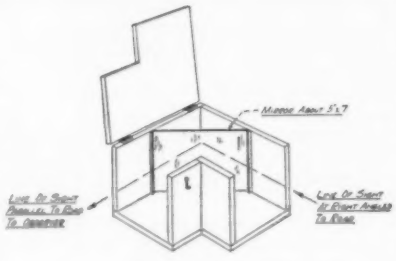


Figure -1-

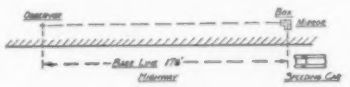
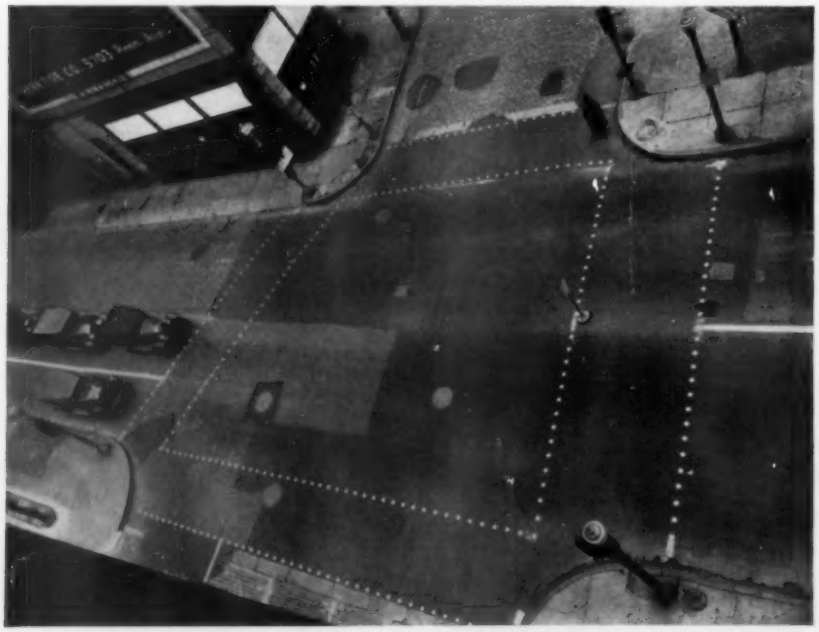


Figure -2-

Commissioner Robbins B. Stoeckel in commenting upon the device states:

"Its future use and its importance in determining the policies of states relative to speed, and its importance in assisting enforcement, can hardly be overestimated. In any jurisdiction which has a reasonable-rate-of-speed law, the question always arises as to what is a reasonable rate under any given circumstances in any given location. By means of this simple instrument, it becomes possible to ascertain . . . . at the expense of a small amount of time . . . . what are prevailing practices. About a hundred readings can be made inside of a half hour. When those are plotted out, the exaggerated cases of speed, either fast or slow, will at once show on a diagram, and from it, aside from the extremes, the average reasonable rate at which people travel will be apparent."



Courtesy of Thompson Products, Inc.

TRAFFIC MARKERS AT A PITTSBURGH INTERSECTION

Metal Roadway Markers Successful in Pittsburgh

AFTER an extended trial of permanent metal roadway insert markers in the heaviest traffic section of Pittsburgh, Pa., 10,000 additional markers were ordered, duplicating the number installed in September, 1931, and providing enough to complete the installation in the downtown and outlying business districts and on main boulevards.

Markers have been installed in five kinds of pavement. Unit costs for installation were found to be: asphalt, 9 cents; concrete, 9½ cents; brick, 10 cents; wood block, 10 cents; blockstone, 25 cents. About 25 per cent of the markers were installed in blockstone, and of these not more than 12 have been dislodged. No difficulty was had with those installed in the other pavement types.

Under the new specifications, markers may be of aluminum, bronze or steel alloy. The aluminum must be of a Brinnell hardness of 115-125. Bronze or steel alloy markers shall have a Brinnell hardness of 150-170. Regardless of the metal, specifications require a minimum elongation of 15 per cent in 2 inches, a yield and shearing strength of 30,000 pounds per square inch, and a tensile strength of 55,000 pounds per square inch.

The visible portion of the markers has a series of vertical ribs, ⅜-inch to 7/16-inch wide and ⅛-inch deep, to assure more secure footing to pedestrians. Ribs are polished to afford better reflection.

Center and lane line markers are oval in shape, 6 inches long by 3 inches wide and are installed 18 inches apart. Crosswalk and stop-line markers are circular, 4 inches in diameter, and are installed 15 inches apart.

No-Parking Foes Defeated in Chicago

ATTEMPTS to substitute limited-time parking for no parking, in the Chicago Loop, recently failed by a vote of 29 to 19 in City Council.

The present ordinance prohibits parking in the central business district between 7 A. M. and 6 P. M. on business days, except for loading and unloading of passengers and merchandise. Its validity has been sustained by the Illinois Supreme Court.

Loop merchants proposed a trial of one-hour parking, claiming that the no-parking rule is causing a yearly business loss of millions of dollars. Data presented by those who favor no-parking, demonstrated that off-street parking facilities are adequate, that Loop traffic volume and speeds have materially increased and that traffic injuries in the Loop have dropped 47 per cent and fatalities 70 per cent, whereas accidents and fatalities in the remainder of the city have increased 20 per cent.

Making Better Use of Traffic-Enforcement Facilities

By FRANKLIN M. KREML

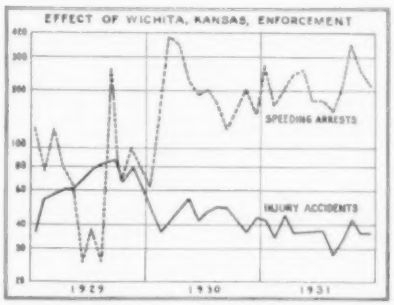
Chairman, Law Enforcement Committee, Street and Highway Traffic Section, National Safety Council;* and Director, Accident Prevention Bureau, Evanston, Ill., Police Department

DURING the last several years traffic-law enforcement has come to be recognized as the most vital single factor in combating traffic accidents. National statistics, which reveal that motor-vehicle accidents last year claimed 33,500 lives and injured a million persons and entailed an economic loss of $700,000,000, challenge the officials and the public of this country to combat these accidents vigorously.

Recognition of the power of an adequate enforcement program has come slowly as various cities have pioneered in the enforcement field. Their experience has demonstrated that improved enforcement has been accompanied by reductions in accidents, while relaxation has brought a higher accident experience.

A reduction of arrests and convictions in 1928 was accompanied by the greatest number of fatalities during the five-year experience, while a more vigorous program of enforcement in 1929 brought down the fatalities again. From this one illustration alone it is easy to see how lax and unsuccessful enforcement must be taking the lives of hundreds of innocent men, women and children every year. But the illustration also shows the hopefulness of the present situation, when the number of cities that are striving with considerable success to improve their traffic-law enforcement is increasing.

City police departments have ever been harassed with the problem of crime. This aspect of police work should not be minimized, but its seriousness does not justify indifference to other problems of importance, such as that of traffic, which claims three times the number of lives that crime does. This traffic problem must be attacked as vigorously as any other menace to public safety. But, since man-power is a problem and since every police department has more demands than it can adequately meet under present conditions, it becomes necessary to make the best use of the facilities at hand to avoid wasting, through inefficiency, the police strength that we have.



Intelligent Selection

Our forces being limited, we must base our enforcement program on such selection as will bring the greatest results in public safety from the efforts expended. This selective enforcement should be directed to those areas where most accidents are occurring, with police attention focused upon those violations that are the principal causes of accidents. This requires a knowledge of the local accident experience, which can be acquired only through adequate reports of all traffic accidents, tabulated and analyzed either weekly or monthly. It is obviously inefficient to spend time and money making arrests for technical violations of the speed limit on a through street, where speed slightly above the limit may be comparatively safe, when other violations at much lower speeds may be the principal causes of accidents in other parts of the city.

In Wichita, Kansas, the accident records revealed that speeding was an important factor in traffic accidents. Arrests for this violation were increased and accidents were reduced. Later a relaxation of the enforcement efforts resulted in an immediate rise of the accident curve, as shown in the accompanying figure. Selective enforcement directed at the root of the difficulty immediately brought results.

Maxwell Halsey, Traffic Engineer, of the National Bureau of Casualty and Surety Underwriters, summarized the enforcement of traffic laws well when he said, "It is traffic-enforcement sharpshooting, rather than scatter-gun barrage, that brings results." Only through such "sharpshooting" can a city expect to secure the greatest return from its enforcement "man-dollar."

The Evanston Police Department inaugurated enforcement sharpshooting of another kind, when it installed its Accident Investigation Squads. Chicago, Cleveland, Detroit, Minneapolis, St. Paul, Washington and Wichita are other cities that have inaugurated the same plan of using tape and camera to obtain convicting evidence in accident cases. The success of this method is attested by every city that adopts it and that watches the growing percentage of convictions and the increasing volume of information about the violations that may cause accidents.

Selectivity in enforcement should extend even further than these methods. It should meet accident peaks with a maximum of man-power. In most American cities the accident peak begins its rise at about four o'clock in the afternoon. In many police departments this is the hour when the shifts change, when the large day-traffic squad goes off duty and the comparatively small evening shift comes on.

This difficulty may be met by breaking the day shift into two squads, one of which would start at the usual time and go off duty at four o'clock and the other would go on duty at ten in the morning or even as late as noon and work until six or eight in the evening. This gives the city a maximum of traffic police protection during the danger period in the evening, which starts at four and continues until seven or eight. The application of this principle can be varied to meet the needs of different communities.

* EDITORIAL NOTE.—During the month of September more than fifty important American cities are taking part in the National Traffic Law Enforcement Demonstration, conducted by Mr. Kreml's committee. The results of this demonstration will be reported to the Twenty-first Annual Safety Congress at Washington, D. C., October 3-7, and will be tabulated and analyzed as the basis for the committee's annual report. Since the publication of the list of 47 participating cities at page 19 of THE AMERICAN CITY for August, Louisville, Ky., Minneapolis and St. Cloud, Minn., and Miami, Fla., have been added.

EQUIPMENT FOR INVESTIGATING TRAFFIC ACCIDENTS

The Evanston Accident Investigation Squad is equipped with a first-aid kit, and the car may be used as an emergency ambulance. In addition, there is complete equipment for taking photographs night or day, for making ordinary measurements, and for taking down, on the spot, the statements of witnesses

The discussion up to this point would indicate that the lack which is evident in our American enforcement plan is twofold. First, we must increase our arrest volume; and second, we must direct our enforcement more intelligently to meet those difficulties which make enforcement necessary.

The latter need—directed enforcement—is purely a matter of organization and administration. This activity may be easily set up in any police department that recognizes its value simply by keeping and using its accident records. The second need—increased volume of enforcement—is of equal importance; but this involves more than a matter of manpower. Such man-power as is available is burdened with endless details and escorts—funerals, weddings, and the escort of dignitaries. These activities should be minimized. The prime function of the traffic police is traffic control for public protection, rather than prostitution of their authority to curry favor.

The volume of traffic arrests is further reduced in many cities by systematic and wholesale discouragement of the enthusiastic traffic officer through the "fixing" or "adjustment" of arrests. This has grown to the point where it is often considered to be a legitimate, regular means of dispensing political patronage and favor. The damage done to police morale and the consequent price paid by the community in accidents, deaths and injuries, is incalculable.

This criticism has often been met with a counter argument, the gist of which is that poor or unjustified arrests make these "adjustments" necessary. Perhaps some small percentage of cases are of that type. But instead of justifying wholesale "fixing," this condition rather indicates a need for traffic-police training and selection.

The Commonwealth of Pennsylvania has for many years recognized that the training of its motor patrol is an excellent investment; that it weeds out the unfit and gives the man on the road synthetic "experience." It eliminates the "trial and error" method of training police, for which the public often pay so dearly. Several other state patrols and city police departments now recognize the need of such training, and the present trend toward the establishment of police training schools is remarkable.

Summarizing this into a practical and concise program: Select clean, intelligent, enthusiastic young men for traffic work; train them thoroughly; give them adequate equipment; have them direct their activities where and when they are most needed. Do not discourage them by involving them in politics and subjecting them to the evils of "fixing." Teach them how to handle violators properly and then support them to the limit by letting every case go to court for decision on its merits.

The return on such an investment in selection, training, and administration will be amazing, not only in lives saved and injuries prevented, but in the building-up of fine public relations that will far exceed in value the few favors or benefits to be secured by petty favoritism.

Cleveland Challenges the Slum

WITH the exception of the work of the State Board of Housing in New York City, the most careful and comprehensive proposals that have come to the attention of THE AMERICAN CITY for the use of Federal funds now available for large-scale, low-cost housing operations, are being developed in Cleveland, Ohio. The campaign owes much to the leadership of Ernest J. Bohn, Chairman of the Housing Committee of the City Council, and to the effective cooperation of a large number of organizations and individuals interested in solving the problems of the city's blighted areas and slums.

In a report submitted to the City Council on August 8 (and available in a special Supplement to the City Record of that date) it is stated that:

"Every branch of the building industry appearing before the Committee has pledged its cooperation towards bringing about the desired results, which are slum elimination and the providing of adequate housing for the low-income group and a step towards the revival of business. There is testimony on record which leads the Committee to believe that

"(a) The owners of the fee in the property would in most cases exchange their rapidly disappearing equity for an interest in the new housing project;

"(b) Banks and other money lenders would exchange their present investment, the security for which is rapidly disappearing, for investments in the housing corporation;

"(c) The materialman would furnish materials, the payment for part of which could be made in securities of the housing corporation, to be paid for in a period of time instead of demanding full cash payment;

"(d) The architect and the engineer would lend their ingenuity in designing at a minimum of profit in return for the share that they have in this sort of pioneering work;

"(e) The construction contractors would engage on the first few of these ventures without profit, in the hope that it may help to revise the industry;

"(f) Organized labor would cooperate to the extent of an elimination of jurisdictional disputes, lending a helping hand in the revision of building codes, and perhaps recommend that the workers take part of their earnings in securities of the housing corporation instead of demanding full payment in cash."

The Committee urges the enactment by the General Assembly of Ohio and by the Council of the City of Cleveland of laws to provide for the formation and regulation of limited-dividend housing corporations somewhat along the lines of those in force in the State of New York; and after offering various practical suggestions for procedure, the report ends with the following challenge:

"Your Committee cannot too strongly urge that in order to solve the problems caused by the existence of slum and blighted areas the enactment of state and city legislation is paramount. Both private and Federal money is available; every department of the building industry has pledged its cooperation; housing for the low-income group is absolutely essential; a great step towards bringing the community out of the grip of the depression can be taken; a social rehabilitation of thousands of people can be accomplished, but none of these results can follow unless the necessary legislation is first adopted. As soon as the legislation referred to is adopted, it will be possible to start the wheels moving, and it can then be said that Cleveland has again taken the lead in what the Committee believes today to be the most important social activity of either the government or the private individual.

Atrocious Housing Conditions Revealed in New York

IN six square blocks between 7th and 10th Streets and from Avenue B to D in the City of New York, there are, in this year of disgrace 1932, "old-law" tenements to the number of 200. Most of the buildings are of the cold-water, walk-up type, ranging from four to six stories in height. They accommodate, when fully occupied, 2,540 families—more than 12,000 human beings. Even in these times more than 81½ per cent of the apartments are rented.

More than three-quarters of these antiquated structures—159 of the 200—have not a single bathroom in the building. Only 82 of them have water-closets in the apartments; 90 of the remainder having water-closets in the halls, and 28 having these essential toilet accommodations in the yards only. One five-story tenement has only four water-closets for the entire building, and all of these are on the first floor. In another tenement all of the sinks are in the hallways.

Credit is due the East Side Chamber of Commerce for discovering these disgraceful conditions, and for revealing them in an article by the Chamber's Executive Secretary, Joseph Platzker, in the July number of *East Side Chamber News*. In a subsequent letter to THE AMERICAN CITY, Mr. Platzker calls attention to the fact that the yard toilets were supposed to have been outlawed last year by the new multiple-dwellings law, but that apparently little if anything has been done about enforcing that section.

It is all too probable that conditions almost or fully as shocking would be revealed by an investigation of conditions in the blighted areas and slums of many another American city. There is an opportunity here for public service of great importance in the stimulation of employment and the removal of crime- and disease-breeding conditions too long tolerated.

As outlined in some detail on pages 82-83 of the August number of THE AMERICAN CITY, substantial Federal aid is now offered for slum clearance and low-rent housing projects. Will your city use its share of the funds available?

Variety in Roadside Planting

By HENRY T. MOON

The Wm. H. Moon Company, Nurserymen, Morrisville, Pa.

ROADSIDE planting may be for highway shade or for landscape beauty or both. In order to get the desired effect in any such planting, a suitable selection of kinds must be made. Trees must be adapted to the special location, and must be appropriate both in type and in hardiness.

Nothing can supplant for beauty and charm the long-time favorites, the elms and maples, yet there are twenty or more less-used varieties, the virtues and possibilities of which are too frequently lost sight of. Some of these would fit well into street and roadside planting as the major factor. Others would interspace well or be appropriate where smaller growing plants can be used for landscape beauty. They can be used for color, bloom, autumn coloring, and variety. If every roadside planting were standardized, how monotonous traveling would be!

As major items I suggest:

Oaks.—By many, oaks are credited with being slow growers, but permit me to copy a few lines from an article written by the late Samuel C. Moon for Bailey's Encylopedia of Horticulture: "While many soft-wooded trees transplant more readily than oaks and will grow more rapidly immediately after transplanting, still the oaks will in time outgrow them, and will be in their prime when many of the companions of their youth are declining or gone."

Oriental Plane.—This tree is rugged, enduring under a wide variety of conditions, and with many virtues which I believe more than offset its disadvantages of shedding bark and early dropping of leaves.

Lindens.—There are several varieties. They are vigorous growers, and have good foliage, interesting twigs, and seed pods that are fascinating to watch as they fly through the autumn air.

The Ash.—I desire to record my conviction of the possibilities for wider use of the ash family—the American ash, the green ash, and the Pennsylvania red ash. On my lawn, we have possibly the largest American white ash in Pennsylvania. It has perfect conformation and shape. It is 4 feet 2 inches in diameter at chest height, with a branch spread of approximately 90 feet. We have a glorious display of glossy green leaves in the summer and brilliant golden yellow in the autumn. An approaching storm or flurry of wind twists the leaf stems so that the silvery underside is revealed in a very interesting and fascinating way. Not in the growing season only is our great ash a thing of beauty, but when devoid of leaves its majestic branches outlined against a moonlight sky give cause for appreciation.

The Locust.—A disadvantage of the locust is the breaking of the limbs by heavy winds, but it has interesting and unique features and advantages, two of which are that it continues its growth throughout the season and that its falling leaves have virtues somewhat like a legume and will tend to keep the grass beneath the tree fresh and green throughout the open season.

Gymnocladus dioica, with its shaggy bark, interesting branch developments and leaf formation, is the Kentucky coffeetree. In sections where stucco homes predominate, the semi-tropical foliage of this tree and the abundance of shade from its picturesque branches are indeed attractive.

If tree-planting regulations are so drawn as to allow variations in the types of planting and opportunity for interspacing, some unfamiliar varieties can be used under certain conditions:

The Tulip Tree.—This is a tree that is difficult to transplant successfully, but interesting.

The Ginkgo.—This is a native of Japan which seems to thrive in a cool climate or a hot, dry climate. It is extremely erratic, sometimes growing well and sometimes most disappointing in its development and growth. It is to a very large extent disease-resistant.

Gums.—Both sour and sweet give rich autumn color.

Birches.—Catkins make them interesting in spring.

Horsechestnut.—Also its kinsman, the Buckeye.

Magnolia acuminata.—Alfred Rehder indicated that this tree may not be hardy in the latitude of Boston.

Beeches.—European and American. These are attractive for interplanting and for planting in open spaces, boulevard areas, etc.

Common Dogwood—Cornus florida.—In early spring it becomes a profusion of bloom.

Flowering Crabs—Hawthorns and Cherries.

Laburnum anagyroides.—Leaf formation is delicate.

Koelreuteria paniculata or Goldenrain Tree.—It is notable for its splendid and fantastic foliage.

Carpinus or Hornbeam.

Acer rubrum.—The glory of autumn color possibly shows first in this tree.

Acer ginnala.—Here is another bearer of fine autumn leaves.

Mountain Ash.—Who is unfamiliar with its rich autumn berries?

Halesia tetraptera.—Wonderful bell-shaped white flowers blossom in profusion beneath its branches.

Ilex verticillata.—A bearer of myriads of red berries.

Cercidiphyllum.—Attractive shape and leaf development.

For your streets where smoke and dust are problems try: *Paulownia imperialis—Empress Tree or Candle Tree*—Named for Empress Josephine, wife of Napoleon.

For several years I have wanted to try an avenue planting of these trees and practice some severe pruning with them.

With appreciation I refer to my own state of Pennsylvania and a new feature by the State Highway Department in which small groups of evergreens or shrubs are being placed along the highways at points to be especially stressed, as by a warning signal, a mileage marker or route indicator. The development of these plants will add much of interest to the passing traveler. Evergreens do not enter largely into highway work in general. In the western part of Massachusetts at Stockbridge and Lenox, however, are some evergreen roadside plantings which linger long in memory because of their especial beauty.

For the new era, new ideas must be applied. Wider breathing spaces for plants can be provided, raw cuts and fills can and should be planted with flowering shrubs and vines to retain the banks as well as to beautify. When road improvements are being made is the time to make provision for beautifying new sections. Beauty and utility can be pleasantly combined, and wardens, architects, engineers, and citizens should demand appropriate varieties. Planting materials needed for such work must include varieties to suit the particular needs of steep slopes, damp sections, hard, dry banks and fertile meadow sides.

Thomas Nixon Carver, of Harvard, reminds us in his "Principles of Rural Economics" that a few districts of handsome villas cannot suffice for a fully treated highway planting, but that such should extend throughout the whole area of common travel.

One of the most significant road projects of 1931

Bitumuls Retread in West Virginia

A staff writer of a leading engineering magazine, sent to observe the 16½ miles of Bitumuls constructed by the West Virginia Roads Commission, in Raleigh County, in 1931, wrote:

"The resulting surface is remarkably uniform and free from waves. At the same time it lacks any surplus binder in the surface, and the grading of the stone with the two seal coats gives a tight job."

Engineers by the score witnessed this project. Among the many unique construction features on which they commented, were:

1—The project consisted of a combination penetration-retread, on an old sandstone base. Bitumuls HRM was used for mixing and Bitumuls H for penetration. One application of Bitumuls HRM coated the rock perfectly in one mixing operation. Bitumuls H quickly stiffened the mix, prevented displacement, and allowed a minimum loss of stone chips.

2—The prime coat, which would have been necessary with other types of bituminous construction, was eliminated. The low viscosity of Bitumuls allowed sufficient binder to reach the old surface to give an excellent bond.

3—Construction was not held up by rain or thunder storms. Since Bitumuls can be laid in wet weather, it was not necessary to wait for the stone to dry, as is essential with other binders.

4—Traffic was permitted to pass over each stage of construction. And, there was no splattering of the automobiles.

5—A non-skid surface was produced. No "fat" spots were caused by draining from the distributor or over-lapping the center strip. Excess Bitumuls goes through to the subgrade.

On state, county, and city projects by the hundreds, throughout the country, Bitumuls is constantly demonstrating that it is truly "The Modern Way to Use Asphalt". Wherever it is once used, it becomes a permanent part of the paving program.

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Broadcasting Good Government

"PROBLEMS of Government in a Depression" and "Constructive Economy in State and Local Government" will be the general themes of a series of radio broadcasts to be given Tuesday evenings at 8 o'clock, New York time, over the Blue Network of the National Broadcasting Company, from September 6 to December 27.

Last winter the group sponsoring the coming series—the Committee on Civic Education by Radio—began its work of presenting broadcasts on political and administrative topics that should be at once popular and authoritative. This Committee was organized by the joint efforts of the National Advisory Council on Radio in Education and The American Political Science Association. It is non-partisan, and has no special "ism."

The Committee's Chairman, Professor Thomas H. Reed, Director of the Bureau of Government of the University of Michigan, suggests two great fields of usefulness for broadcasts of this kind:

First, they may be used to supplement the formal teaching of civics in the public schools. During the spring series, many teachers assigned each Tuesday night's broadcast as an outside task for their students, and then had them report on it. This practice will be more extensively and thoroughly organized this fall. Tests will be prepared for the use of schools in measuring the results of this radio listening. At a time when schools are having to economize in purchasing supplementary material, the service offered by the Committee on Civic Education by Radio, which is as free as air, will be greatly appreciated.

The other field is, of course, the adult listener. Every effort is being made to make the broadcasts as interesting as possible. Various forms of presentation will be used with the idea of finding out by experiment—and of course there is no other way of finding out—how best to reach the listening ear. If the stores of knowledge of the political scientists can be made available to the ordinary man and woman through the medium of the radio, there will be ground for hope that our Democracy will function better than it has in the past. In these days the people hear little about the problems of government, except in connection with the ballyhoo of politics. If they can have the facts fairly presented by men who know, it will go a long way toward vitalizing popular action.

The Committee has prepared a Listener's Handbook, published by and obtainable free on application to the University of Chicago Press, which also publishes copies of the addresses from week to week. The American Library Association has cooperated in the preparation of a bibliography of supplementary reading, and local librarians are ready to assist the listener.

The detailed program follows:

Pre-Election Series

Government in a Depression

September 6—ISSUES BETWEEN THE PARTIES
Prof. Lindsay Rogers, Columbia University (Democrat)
Hon. F. M. Davenport, M. C., 33rd New York District (Republican)
Algernon Lee, President, Rand School (Socialist)

September 13—ISSUES ABOVE THE PARTIES
Prof. A. R. Hatton, Northwestern University

September 20—CONSTRUCTIVE ECONOMY IN THE NATIONAL GOVERNMENT
A Round Table Discussion, led by
Louis Brownlow, Public Administration Clearing House
Hon. Carl R. Chindblom, M.C., 10th Illinois District
Katherine A. Frederic, National League of Women Voters
William Hard, Publicist
Henry P. Seidemann, Brookings Institution

September 27—CONSTRUCTIVE ECONOMY IN STATE AND LOCAL GOVERNMENT
A Round Table Discussion, led by
Prof. Thomas H. Reed, University of Michigan
Prof. H. W. Dodds, Princeton University
Dr. Luther Gulick, Institute of Public Administration
Prof. Joseph McGoldrick, Columbia University
Dorothy Straus, Women's City Club, New York

October 4—WHAT CAN GOVERNMENT DO TO PREVENT AND RELIEVE UNEMPLOYMENT?
Senator Robert F. Wagner, New York
Dr. Charles A. Beard, Historian

October 11—HOW CAN GOVERNMENT AID FINANCE AND BANKING?
Pres. John T. Madden, Alexander Hamilton Institute
Prof. Walter F. Dodd, Yale University

October 18—HOW CAN GOVERNMENT PROVIDE GREATER SECURITY IN OUR ECONOMIC SYSTEM?
Paul Mazur, Partner, Lehman Bros., New York
Prof. A. W. MacMahon, Columbia University

October 25—MECHANICS AND MANEUVERS OF CAMPAIGNS
Prof. A. N. Holcombe, Harvard University

November 1—WHY VOTE?
Prof. Charles E. Merriam, University of Chicago

Post-Election Series

Constructive Economy in State and Local Government

November 15—RETRENCHING IN STATE AND LOCAL EXPENDITURES: A GENERAL VIEW
Hon. Murray Seasongood, Pres., National Municipal League
Prof. A. R. Hatton, Northwestern University
(A summary of the report of the Committee on Constructive Economy of the National Municipal League)

November 22—REDRAWING THE BOUNDARIES OF LOCAL GOVERNMENT
Prof. Thomas H. Reed
Howard P. Jones, National Municipal League
Prof. George S. Counts, Columbia University

November 29—REDISTRIBUTING FUNCTIONS OF STATE AND LOCAL GOVERNMENT
Prof. Paul W. Wager, University of North Carolina
Hon. O. Max Gardner, Governor of North Carolina
Hon. Harry F. Byrd, ex-Governor of Virginia

December 6—REORGANIZING COUNTY GOVERNMENT
Prof. A. W. Bromage, University of Michigan
Prof. Leonard D. White, University of Chicago
Dr. Lent D. Upson, Detroit Bureau of Governmental Research

December 13—REFORMING FINANCIAL METHODS
Dr. Luther Gulick
Prof. Harley L. Lutz, Princeton University
Dr. Russell Forbes, National Municipal League

December 20—REDUCING AND LIMITING LOCAL INDEBTEDNESS
Carl H. Chatters, Municipal Finance Officers' Association
C. E. Rightor, Detroit Bureau of Governmental Research
Henry Hart, Pres., Michigan Municipal Advisory Council

December 27—REVISING OUR STATE AND LOCAL TAX SYSTEM
Dr. W. F. Willoughby, Brookings Institution
Prof. Wm. Anderson, University of Minnesota
Dean Isidor Loeb, Washington University

Utility Rate Reduction as a Public Economy

IN these days of tax-saving crusades, one of the items too easily eliminated from municipal expenditures is the cost of special investigations into various municipal problems. This is being carried to the extreme whereby much greater economies that could be secured as a result of such studies, either for the municipal government or for the citizens as a whole, are lost to the community. One important example of this is in the field of public-utility rates. Taxpayers' organizations, as well as the public-utility interests themselves, sometimes oppose expenditure of municipal funds for rate surveys or litigation, but if thereby substantial reductions in rates can be secured, the general public, a large proportion of whom may be taxpayers, obtain the advantage of lower rates, which, with diminished incomes, is a welcome form of relief.

Payments in rates to privately owned utilities, as a matter of fact, exceed payments in the form of local taxes. The figures for 1927, the date of the last Federal census of manufactures (including electric light and power, electric railways, telephones, and manufactured gas), as reported in Moody's Manual of Public Utilities, 1932 edition, are as follows, for privately owned utilities:[1]

Electric light and power	$1,964,000,000
Electric railways	965,000,000
Telephones	997,000,000
Manufactured gas	446,000,000
Natural gas[2]	318,000,000
Total	$4,690,000,000

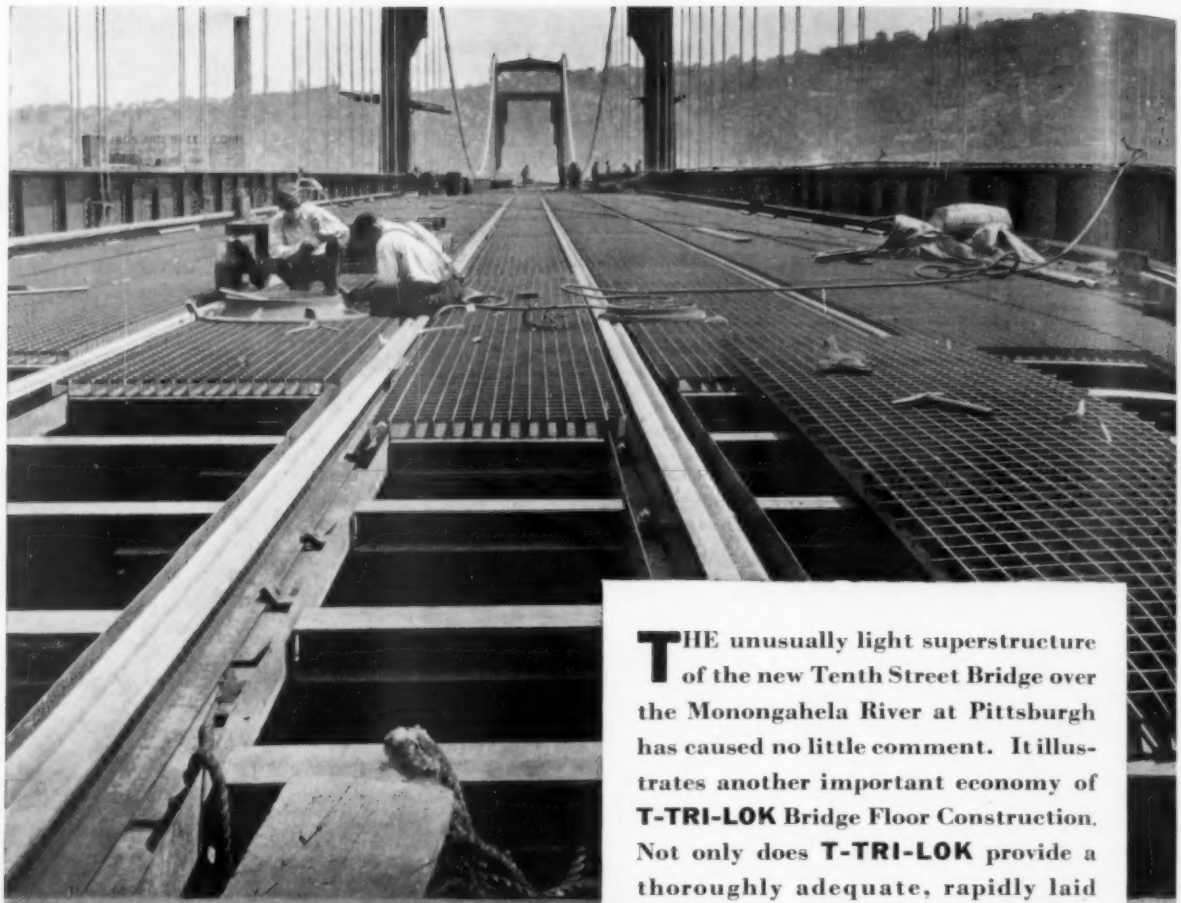
In the same year the payments for local taxes, including those of counties, townships and school districts as well as cities, according to the National Industrial Conference Board, were $4,367,000,000, of which $4,061,000,000 was in the form of property taxes. For cities of over 30,000 population—whence a large proportion of utility revenue comes—the general property tax in 1927 amounted to only $1,888,704,574[3]. The relative proportions of utility revenues and tax payments are not likely to have changed substantially since that year.

It is apparent from these figures that a reduction of, say, 10 per cent in public utility rates would amount to considerably more than a similar reduction in local taxes. It is likely that such a reduction would benefit more people desperately in need of financial relief than a tax reduction of equal amount; fur-

[1] Water is not included, since it is chiefly supplied by the municipalities themselves. The revenues of private water companies are believed to be about $100,000,000.

[2] U. S. Bureau of Mines.

[3] U. S. Bureau of the Census, "Financial Statistics of Cities Having a Population of Over 30,000: 1927."



THE unusually light superstructure of the new Tenth Street Bridge over the Monongahela River at Pittsburgh has caused no little comment. It illustrates another important economy of **T-TRI-LOK** Bridge Floor Construction. Not only does **T-TRI-LOK** provide a thoroughly adequate, rapidly laid bridge floor, but the light weight of the finished floor permits a material reduction in the weight of the superstructure. *Send today for descriptive literature.*

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thermore, a reduction in taxes, and therefore in municipal expenditures, tends to be at the sacrifice of socially valuable services and of the purchasing power of municipal employees.

Utility rate reductions need not, and, in fact, should not, be the excuse for reduction in service or in the salaries and wages of the rank and file of utility employees, frequently underpaid in the past. Instead, the present time offers a great opportunity to cities to force reductions in swollen valuations and excessive returns, based thereon and tending to be increased by lowering of operating costs.

Under the reproduction cost theory, as advocated by the utility companies, property valuations have been increased, in many cases far out of proportion to actual investment. The shoe is now on the other foot, and if the reproduction theory were applied rigidly on the basis of today's prices, disastrous results might follow in company finances. The policy, widely recognized as sound from the point of view of both the public and conservative utility finance, of basing rates on the actual prudent investment, can now be urged with great effect. This does not necessarily involve complete property appraisals; in fact, astonishing results in forcing rate reductions are sometimes secured by relatively almost insignificant expenditures for technical investigations under expert direction, with the companies' own records and reports as the chief basis. Two recent examples of this are the city of Memphis, Tenn., and the county of Westchester, N. Y.

In Memphis, Mayor Watkins Overton instructed City Attorney Walter Chandler to make his own investigation of electric rates in that city, so that the Tennessee Railroad and Public Utilities Commission might have evidence before it from the consumers' standpoint in the hearings on the Commission's order to the electric company to show cause why rates should not be reduced. As a result, a reduction of $260,000 per annum was secured for the consumers, with an expenditure of less than 1 per cent of this amount for outside expert assistance. The communities of Westchester County could have saved the taxpayers $9,000, the cost of special technical help utilized in an investigation, under the leadership of the city of New Rochelle, into the rates of the Westchester Lighting Co., but the consumers would not then have gotten the benefit of a rate reduction of $875,000, nor would the communities have reduced their street-lighting cost by $125,000 per annum.

These results are not necessarily typical; but even if a city in its efforts to assist consumers becomes involved in extensive litigation requiring detailed valuation studies, the times are favorable for obtaining results greatly beyond the costs incurred. Moreover, a thorough economic and engineering study of the possibilities of municipal utility plants—the outstanding form of self-liquidating public works—may prove to be a most effective means of obtaining reduced rates, either from the utility companies or by direct municipal ownership.

$2,300,000,000 of Suspended State and Municipal Projects

THE American Society of Civil Engineers, through its local sections, has for the past two months collected data in regard to state and municipal projects that have been suspended on account of difficulties in financing at reasonable rates of interest. Disregarding Federal public works, the normal annual program of state and municipal public works has for the past ten years been between $2,500,000,000 and $3,000,000,000. Indications are that this year public works of this class will not aggregate more than $800,000,000. The result has been that nearly 2,000,000 people who would normally find seasonal employment on public works have not found work and that unemployment has increased at an alarming rate.

The prevalent low rate of operations in the supply industries, such as steel and cement, is partly due to this cause, and other industries have suffered greatly through the loss of purchasing power by these two million workers and their dependents totalling over 8,000,000 people. One of the foremost steps in the Federal program for a return to normal conditions was the passage of the amendments to the Reconstruction Finance Corporation Act, popularly known as the Wagner Bill, which provides for loans to States, municipalities and political subdivisions for the construction of self-liquidating projects.* The survey conducted by the American Society of Civil Engineers has not yet been completed and only a partial list can be supplied at this time. This list shows state and municipal projects aggregating $1,400,000,000 which are ready to go and others aggregating $900,000,000 which could rapidly be made ready. There have been omitted from this list roads, streets, public buildings, charitable institutions and recreation facilities, except where self-liquidating, and it is believed that the remaining projects are self-supporting or could be made so by local legislation.

A large percentage of the public works in the list consists of water works and sewers which are vital community facilities and in which the health and well-being of the communities are involved. The need for such facilities depends upon the growth and concentration of the population and continues to increase even during a depression. Three-quarters of the water works and practically all of the sewers are publicly owned, and indefinite suspension of these public works will involve grave danger, as pollution in many metropolitan areas is already becoming alarming.

The relief bill offers a real opportunity for communities that still have courage, to secure needed facilities at bargain prices and to solve the employment problem with profit to themselves.

COL. JOHN PHILLIP HOGAN,
Chairman, Committee on Public Works,
American Society of Civil Engineers.

* For text of these amendments, see THE AMERICAN CITY for August, pages 80-81.

Water-Works Improvements Needed

THE water-works construction survey conducted by the Cast Iron Pipe Research Association reveals the following situation, in mid-August, for the 1,769 municipalities over 2,500 in population in the United States from which reports had been secured,—56 per cent of the total number, 3,165:

	Number	%
No money—no improvements needed..	346	19.5
No money—need improvements.....	232	13.1
Have money—no improvements needed	440	24.9
Have money—need improvements.....	543	30.7
Private water companies.....	208	11.8
	1,769	100.0

It will be noted that 43.8 per cent of the municipalities included have publicly owned water systems that need improvements. It is believed that with the needs of private water companies included, well over 50 per cent of all communities of over 2,500 population are behind in water-works construction. A number of the municipalities also contemplate the construction of sewage-disposal plants.

The 1933 Highway and Building Congress

DURING the week of January 16-23, 1933, ten national organizations representing every phase of the great highway and construction industry of the United States will gather at the Highway and Building Congress in Detroit, Mich. This group will include federal, state, county and municipal officials as well as representatives of every branch of the industry. The combined experience and intelligence of the group will be devoted to determining the place of construction in the new economic situation. Among the participating organizations are: Construction League of the United States, American Road Builders' Association, Associated General Contractors of America, Motor Truck Executives Association, Asphalt Institute, National Crushed Stone Association, National Paving Brick Association, National Ready Mixed Concrete Association, National Sand and Gravel Association and Portland Cement Association.

The program calls for concurrent meetings of the several individual organizations during the first three days, to be followed by a joint session to map a coordinated procedure for the entire industry and allied enterprises. An exhibit of highway and building materials and equipment, sponsored by the American Road Builders Association, will be held at the Detroit Municipal Airport, simultaneously with the Congress and the annual convention of the Association. Further information as to this exhibit and the Congress may be had from Charles M. Upham, Engineer-Director of the Association, National Press Building, Washington, D. C.

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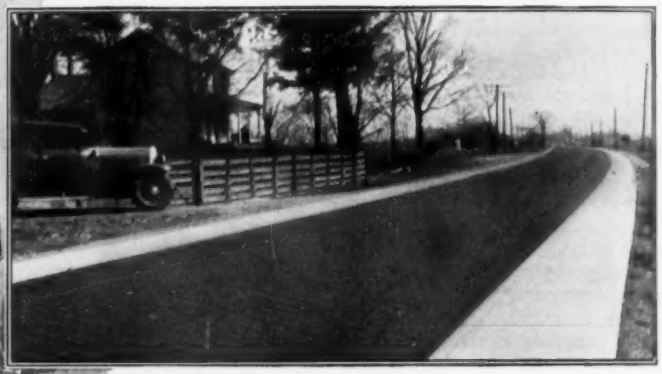

Lancaster Pike, Fairfield County, Ohio—Resurfaced with Vitrified Brick 1926—Practically no maintenance to date

● Some of the finest roads ever built are brick resurface jobs. The old, failing pavements were reconditioned by adding a brick wearing and protective surface. Resurfacing with brick stops the compounding of maintenance expense, for then the base is protected from weather as well as traffic damage. Brick has the longest life and lowest upkeep of any pavement. For further information write National Paving Brick Association, 1245 National Press Building, Washington, D. C.

BRICK—the Pavement that Lasts

How the 1932 Revenue Act Affects Municipalities

CERTAIN portions of the Federal Revenue Act of 1932 are of special interest to cities and other local governments. They are included under Title IV, Manufacturers' Excise Taxes, and Title V, Miscellaneous Taxes.

Under Title IV taxes, to be paid by the manufacturer, producer or importer, are imposed upon various articles. Those of special interest to municipal governments include automobiles, tires and inner tubes, gasoline and lubricating oil, and a few others occasionally purchased. A tax is also laid upon electrical energy for domestic and commercial purposes, to be paid by the consumer and collected by the seller. These taxes, with the exception of that on electrical energy, are dealt with in Regulations 44 and 46 of the Bureau of Internal Revenue, U. S. Treasury Department. The question of exemption of sales to municipalities is covered in Article 9 of Regulations 44, which states:

> If articles are sold directly to a state or political subdivision thereof for use in the exercise of an essential governmental function, the tax does not attach, but sales to a dealer or distributor are taxable even though the manufacturer has knowledge that the articles are destined for ultimate use by or resale to a state or political subdivision thereof.

Under Title V various miscellaneous taxes are imposed, those of interest to municipalities being the taxes on telephone, telegraph, cable and radio messages, leased wires and talking circuits; admissions; leases of safe deposit boxes; and checks. These, with the exception of admissions, are dealt with in Regulations 42, which also cover the tax on electrical energy. All the taxes just mentioned are paid by the consumer, and municipalities are exempt, at least in part, where the services involved are for governmental purposes. As to telephone, telegraph, etc., Section 701 (b) of the Revenue Act provides that "No tax shall be imposed under this section upon any payment received for services or facilities furnished to the United States or to any state or territory, or political subdivision thereof, or the District of Columbia": but this is interpreted as follows in the regulations (Art. 19):

> Telephone, telegraph, cable and radio dispatches, messages and conversations relating to government business, which originate in the United States and which are a charge against the United States, the District of Columbia, a state or territory, and are paid from the funds thereof, are exempt from the tax. Messages, conversations and dispatches which are not paid from such funds are not exempt from tax, even though they relate to government business.
>
> The words "state" and "territory" include political subdivisions thereof, such as counties, cities, towns and other municipalities.

As to the tax on checks, the cities are exempted under Art. 36 of Regulations 42, as follows: "The checks, drafts or orders drawn by officers of the United States or of a state, county or municipality, or of a foreign government, in their official capacities, against public funds standing to their official credit and in furtherance of duties imposed upon them by law, are not subject to the tax."

No specific exemption for cities as to the tax on leases of safe deposit boxes is provided, but it would seem consistent with the regulations quoted that such boxes used for governmental purposes and paid for from public funds should not be taxed.

As to admissions (Sec. 711 of the Act), municipal officers on official business, when admitted free or at reduced rates, are exempted from paying the tax.

Tax on Electrical Energy

The chief contact of the municipalities with the Federal Government under the Revenue Act is in the case of municipally operated electric systems. Electrical energy used by the city itself is not taxed, whether it comes from a public or a private plant; but where the city sells current to domestic or commercial consumers it is required to collect a tax of 3 per cent of the bills and turn it over to the Federal Government. The following two paragraphs of Art. 40, Regulations 42, as amended July 26, are of special interest:

> The tax applies to the amount paid for all electrical energy furnished for domestic or commercial consumption by any person or agency (whether private, public or quasi-public) irrespective of whether such person or agency produces the energy so furnished. [The term "person" means an individual, a trust or estate, a partnership or a corporation.]
>
> All electrical energy furnished the consumer is taxable except (1) electrical energy furnished for industrial consumption, e. g., that used in manufacturing, processing, mining, refining, shipbuilding, building construction, etc., and (2) that furnished for other uses which likewise can not be classed as domestic or commercial, such as used by public utilities, water works, irrigation companies, telegraph, telephone, and radio communication companies, railroads, other common carriers, educational institutions not operated for private profit, churches, and charitable institutions. However, electrical energy is subject to tax if consumed in the commercial phases of industrial or other business, such as in office buildings, sales and display rooms, retail stores, etc.

The requirement that municipal electric systems collect this tax from their domestic and commercial consumers has been attacked in some quarters as an unwarranted and even illegal interference with city affairs; and consideration has also been given to the possibility, assuming the validity of the tax, of the municipal utility's absorbing it. While a municipal electric establishment is required to bill and collect the tax from the consumers affected, it has nevertheless been suggested by the Attorney-General of Indiana, as reported in a recent bulletin of the New York State Bureau of Municipal Information, that a utility can absorb the tax if it so desires, but in order to do so, must reduce its rates, with the approval of the Public Service Commission, by the proper amount so that when the 3 per cent is added the bills will be the same as at present. The Wisconsin Public Service Commission has approved this method. It would seem that in states where no public utility commission has jurisdiction over rates of municipal electric systems, rates could be reduced for this purpose still more readily. On the other hand, the Attorney General of Iowa is quoted in the same bulletin as saying:

> "To permit the payment of the Federal tax on the customers' light bills out of the profits of the plant would permit discrimination and the taxpayers in the city who were not power users could, in our opinion, bring an action to enjoin such a practice."

The Municipal Bond Market

THE following is a representative list of recent sales of new issues of state and municipal bonds, taken from current issues of *The Bond Buyer*:

Amount	City or Other Public Body	Rate (%)	Term (Years)	Basis (%)
$ 200,000	Springfield, Mass.	3¾	18 1/6 (avg.)	3.54
3,076,000	Maryland	4½	9½ (avg.)	3.79
1,000,000	Maine	4	20½ (avg.)	3.85
1,000,000	Illinois	4	6 1/3	4.04
2,300,000	Pittsburgh, Pa.	4¼	12.5 (avg.)	4.06
5,000,000	Missouri	4¼	20-24 (ser.)	4.06
245,000	Utica, N. Y.	4¼	6.7 (avg.)	4.20
500,000	Ramsey, Co., Minn.	4½	11 5/6 (avg.)	4.32
740,000	Sacramento Co., Calif., Sacramento High Sch. Dist.	4½	8 1/6 (avg.)	4.49
992,000	Pasadena, Calif.	4⅜	10-40 (ser.)	4.63
1,676,000	Mt. Vernon, N. Y.	4.79 (avg.)	7.75 (avg.)	4.70
937,000	Los Angeles Co., Calif.	5	7 5/6 (avg.)	5.00
690,000	Santa Monica, Calif.	5	19½ (avg.)	5.00
304,000	Beverly Hills, Calif.	5¼	9.1 (avg.)	5.16
500,000	Memphis, Tenn.	5.55 (avg.)	9 (avg.)	5.30
130,000	Huntington, N. Y., Sch. Dist. No. 7	5.60	1-26 (ser.)	5.59
179,148	Liverpool, N. Y.	6	15.4 (avg.)	5.99
203,000	Cleveland, Ohio	6	4.6 (avg.)	6.00

Detroit Defeats Obstructive Tax Restrictions

VOTERS of Detroit, Mich., have rejected, 126,578 to 40,050, a proposed charter amendment that would have drastically hampered the conduct of municipal affairs and even endangered the city's credit. Mayor Frank Murphy and the Council had already slashed the $72,600,000 budget to $65,000,000, on account of tax delinquencies, but the real estate interests and others sponsoring the amendment would have cut this to $61,000,000, with a mandatory reduction of $1,000,000 per annum hereafter, down to $57,000,000.

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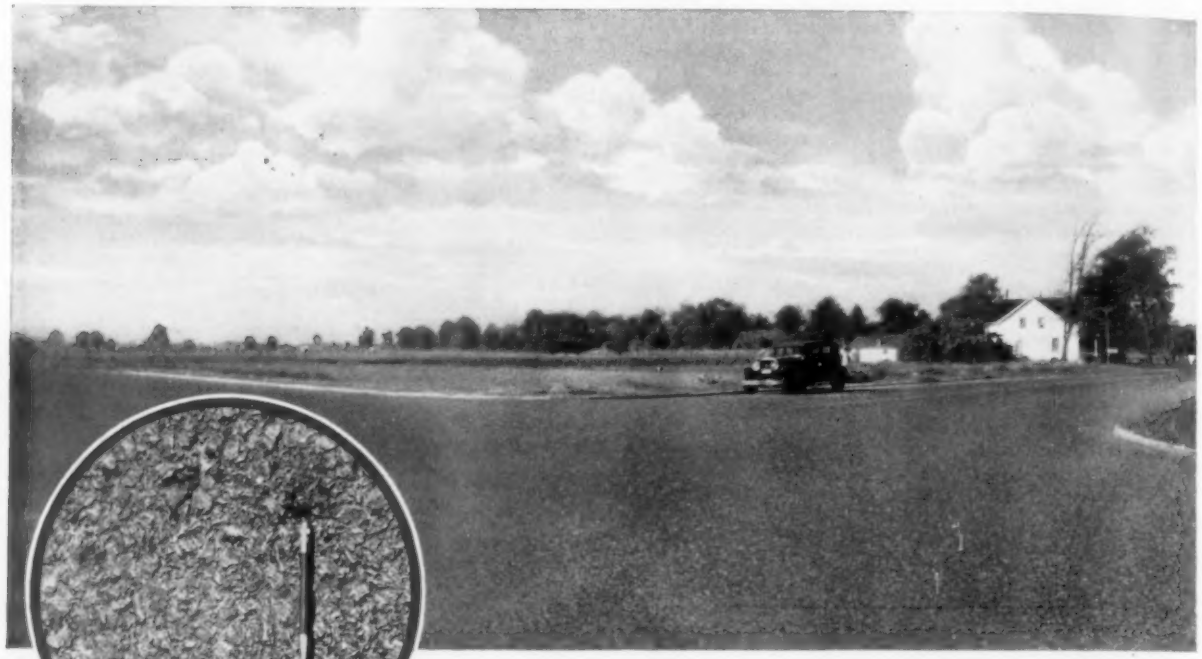
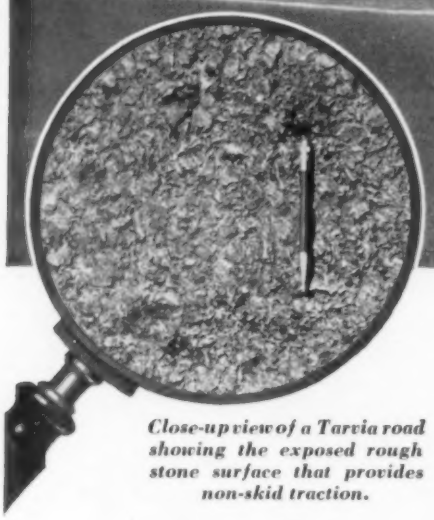
To road officials and highway engineers this matter of traffic safety is of equal importance with durability and low cost. Tarvia roads qualify on all counts. Easy and inexpensive to build, with only the most economical maintenance they will last for many years—always smooth, easy-riding and *non-skid.*

The Tarvia field man will gladly tell you more about Tarvia. Phone, wire or write our nearest office.

Junction Bancroft Road and U. S. Highway No. 20, Lucas County, Ohio. Tarvia-built.





Close-up view of a Tarvia road showing the exposed rough stone surface that provides non-skid traction.

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THE CITY'S LEGAL RIGHTS AND DUTIES

Conducted by A. L. H. STREET, Attorney at Law

Accidents

City held not liable for automobile breaking through bridge railing on colliding with another car (Minnesota Supreme Court: *Tracey v. City of Minneapolis*, 241 N. W. 390).

Municipality held liable for injury to elector while visiting municipal building to vote at county election, due to negligently maintained stairway (California District Court of Appeals: *Boothby v. Town of Yreka City*, 4 Pac. 2d, 589).

City held not liable for damage to automobile attributed to failure of traffic light to function (Ohio Court of Appeals: *Martin v. City of Canton*, 180 N. E. 78).

Village held liable for fire loss caused by negligent maintenance of electric equipment used in selling surplus current outside corporate limits (Vermont Supreme Court: *Valcour v. Village of Morrisville*, 158 Atl. 83).

Town held liable for explosion resulting when boy placed lighted paper near disused gasoline tank under sidewalk left open and unlocked for more than month (West Virginia Supreme Court of Appeals: *Bryant v. Guyan Valley Oil Co.*, 163 S. E. 773).

City held liable under Workmen's Compensation Act for injury to driver of contractor for disposal of ashes, etc. (Connecticut Supreme Court of Errors: *Massolini v. Driscoll*, 159 Atl. 480).

Bonds and Warrants

City held not liable on warrants unauthorizedly issued by Mayor and Clerk (United States Circuit Court of Appeals, Fifth Circuit: *City of Weslaco, Texas v. Porter*, 56 Fed. 2d, 6).

Building Regulations

Ordinance regulating installation of warm air heating plants upheld (Illinois Supreme Court: *City of Chicago v. Wonder Heat & Ventilating Systems*, 178 N. E. 192).

Civil Service

Abolition of offices of chief and captain of police, making the sergeant chief of the department, upheld as being in good faith (New Jersey Supreme Court: *Doyle v. Town of Secaucus*, 59 Atl. 399).

Courts will not interfere with discretion fairly exercised by a municipal board in dismissing an employee, but an order of dismissal made in bad faith will be declared void (Indiana Supreme Court: *State v. Richards*, 180 N. E. 596).

Attempt to reduce constables' compensation held invalid as attempt to force resignations (New York Supreme Court, Erie County: *Bogacki v. Zolemski*, 256 N. Y. S. 166).

Municipal Utilities

City furnishing light or other service to consumers held subject to state regulation, but entitled to reasonable return on investment (Indiana Supreme Court: *City of Logansport v. Public Service Commission*, 177 N. E. 249).

City operating electric plant held liable for property damage due to changing phases of electric current without notifying user (Louisiana Supreme Court: *Sugar Bros. Co. v. City of Monroe*, 138 So. 658).

Official Meetings

Statute held not to require committee meetings of county supervisors to be held at county-seat (Iowa Supreme Court: *State v. Nauman*, 239 N. W. 93).

Official Misconduct

Village trustees held not subject to removal for innocently entering into illegal contracts with village for services and supplies (New York Supreme Court, Appellate Division: *Application of Slack*, 254 N. Y. S. 669).

Official Tenure

Statute extending term of mayor held inapplicable to current term (Georgia Supreme Court: *Duffey v. Key*, 162 S. E. 123).

Police Ordinances

Ordinance penalizing intoxication not invalid because not fixing same minimum fine as state law (Alabama Court of Appeals: *Couric v. City of Eufaula*, 138 So. 557).

Policemen

City held not liable for assault by policeman although bond had been required of him for faithful performance of duties. (Kentucky Court of Appeals: *Murphy v. Phelps*, 43 S. W. 2d, 1010).

Poor

One held not entitled to support as "pauper" if possessing means for his immediate wants (Connecticut Supreme Court of Errors: *Hartford Hospital v. Town of Berlin*, 158 Atl. 236).

Public Safety

Ordinance requiring indemnity bond to be given before drilling oil wells within city upheld (Oklahoma Supreme Court: *Gant v. City of Oklahoma City*, 6 Pac. 2d, 1065).

Public Utilities

Street-railway rates not affording fair return apart from earnings from electric utility held void as being confiscatory (Wisconsin Supreme Court: *City of Milwaukee v. Railroad Commission*, 240 N. W. 165).

Sewers

City held not liable for overflow of private property through insufficiency of sewer to carry away surface waters where water did not back up but flowed naturally toward the premises (South Dakota Supreme Court: *Deschner v. City of Ipswich*, 240 N. W. 487).

Property owner suing for damages for discharge of unpurified sewage into watercourse held entitled to recover on theory of temporary nuisance (Oklahoma Supreme Court: *Oklahoma City v. Page*, 6 Pac. 2d, 1033).

Sidewalk Obstructions

Crates remaining nearly a day in front of store on busy street held illegal street obstruction (Wisconsin Supreme Court: *City of Neenah v. Krueger*, 240 N. W. 402).

Slot Machines

Vending machine held gambling device because emitting tokens used in operating machine for pleasure (Ohio Court of Appeals: *Snyder v. City of Alliance*, 179 N. E. 426. Tennessee Supreme Court: *Painter v. State*, 45 S. W. 2d, 46).

Special Assessments

Tree-planting assessment held void for lack of notice to abutting property owner (Michigan Supreme Court: *Rood v. City of Detroit*, 240 N. W. 41).

Statutory requirement for hearing on cost, etc., of local improvement held mandatory (Illinois Supreme Court: *City of Alton v. Hellrung*, 179 N. E. 127).

Street Assessments

Street assessment on area basis held void because imposing a greater burden upon lots under divided ownership than lots under undivided ownership (Minnesota Supreme Court: *In re Third Street Widening*, 240 N. W. 355).

Street assessment held not to constitute "indebtedness" within constitutional debt limit nor "tax" within provision regulating taxation (United States Circuit Court of Appeals, Ninth Circuit: *Collins v. City of Phoenix*, 54 Fed. 2d, 770).

Assessment for improving street held invalid for want of statutory petition by abutting property owners (North Carolina Supreme Court: *Sechriest v. City of Thomasville*, 162 S. E. 212).

Street improvement assessment held invalid for gross disparity in assessment of lots on opposite side of street (Michigan Supreme Court: *I. H. Gingrich & Sons v. City of Grand Rapids*, 239 N. W. 876).

Taxicabs

Taxicab operator held subject to regulation although conducting business without solicitation on streets (Rhode Island Supreme Court: *Broadway Auto Livery v. State Board of Public Roads*, 158 *Atl.* 375).

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Prepared by
FRANK B. WILLIAMS
Author of "The Law of City Planning and Zoning"

ZONING and PLANNING NOTES

From Data collected by the Zoning Committee of New York (233 Broadway)

Eminent Domain

DISTRICT OF COLUMBIA.—*Lee v. United States*, 58 Fed. 2d, 879.—The fifth amendment of the Constitution of the United States does not require that the taking of property for public use by the United States must be accompanied or preceded by payment. A judgment against the United States, binding the Government, although not enforceable by execution and levy, is sufficient; with an adequate appropriation for payment.

In case of advance taking, the certification of the Secretary of the Treasury that the amount deposited for payment was just compensation, is not reversible, in the absence of an assertion that his discretion was exercised arbitrarily or wantonly; and does not prejudice the ultimate award to the landowner.

Consent Zoning

KENTUCKY.—*McCown v. Gose*, 51 S. W. 2d, 251.—A statute requiring one desiring to erect a filling station in a residential block to obtain the written consent of owners of two-thirds of the property in the block, is void.

Private Covenants—Dwelling House

MICHIGAN.—*Nerrerter v. Little*, 243 N. W. 25.—In a restriction in a private covenant the words "dwelling house" mean a building designed as a single dwelling for one family.

Boards of Zoning Appeals—Temporary Permit

NEW YORK.—*Matter of Butler v. Connell and Others, Constituting the Board of Appeals of the City of New York*, 235 App. Div. 806.—A permit should issue for a non-conforming gasoline station upon condition that when circumstances so change by the development of the city that the property is reasonably susceptible of being applied to a conforming use, then, upon application of the authorities or anyone interested, the gasoline station must be removed. In the opinion of the Court the property cannot now profitably be devoted to a conforming use.

Billboards

NEW YORK.—*Perlmutter v. Greene, Superintendent of Public Works of the State of New York*, 259 N. Y. 327.—The state may use a highway, of which it holds the fee, for any public purpose not inconsistent with or prejudicial to its use as a highway.

The State Superintendent of Public Works has general supervision over all state highways and in the exercise of such supervision may erect screens to shield travelers on the highways from obnoxious sights of public nuisances or quasi-nuisances and to shut from view scenes which might distract the attention of the driver of a car.

The judgment below (234 App. Div. 896), therefore, restraining the State Superintendent of Public Works from placing a screen at a pronounced curve in a narrow road so as to block a view of a large sign erected on adjacent private lands, is erroneous. "The State Superintendent of Public Works has control of the Mid-Hudson Bridge . . . and has general supervision over all state highways. . . . In the exercise of such supervision and control doubtless he may plant shade trees along the road to give comfort to motorists and incidentally to improve the appearance of the highway. By so doing he aims to make a better highway than a mere scar across the land would be. If trees interfere with the view of the adjacent property from the road, no right is interfered with. So if the Superintendent desires to shield the travelers on the highway from obnoxious sights of public nuisances or quasi-nuisances by the erection of screens more pleasing to the eye, he still acts within his jurisdiction."

For further quotation and discussion see article by Albert S. Bard, at page 50 of THE AMERICAN CITY for August. Apropos of the decision the *New York Law Journal* of August 2 and 3 contains an editorial on "Public Esthetics."

Non-conforming Use

RHODE ISLAND.—*Morgan v. Zoning Board of Review of Town of Warwick*, 160 Atl. 922.—Granting a permit for a dwelling on a lot of less than 5,000 square feet, contrary to the zoning ordinance, to replace an old dwelling erected before the enactment of the ordinance, is not an abuse of discretion.

Prohibition of Use Within Given Distance of Another Use

TENNESSEE.—*Higgs v. City of Martin*, 51 S. W., 2d, 237.—An ordinance prohibiting the location of a gasoline service station within 300 feet of a church is valid, in spite of the fact that other filling stations are located nearby, one or two of which are within that distance of the church in question, and their operation is not prohibited.

This case concurs with the Spencer-Stierla case, and cites other cases similar in principle.

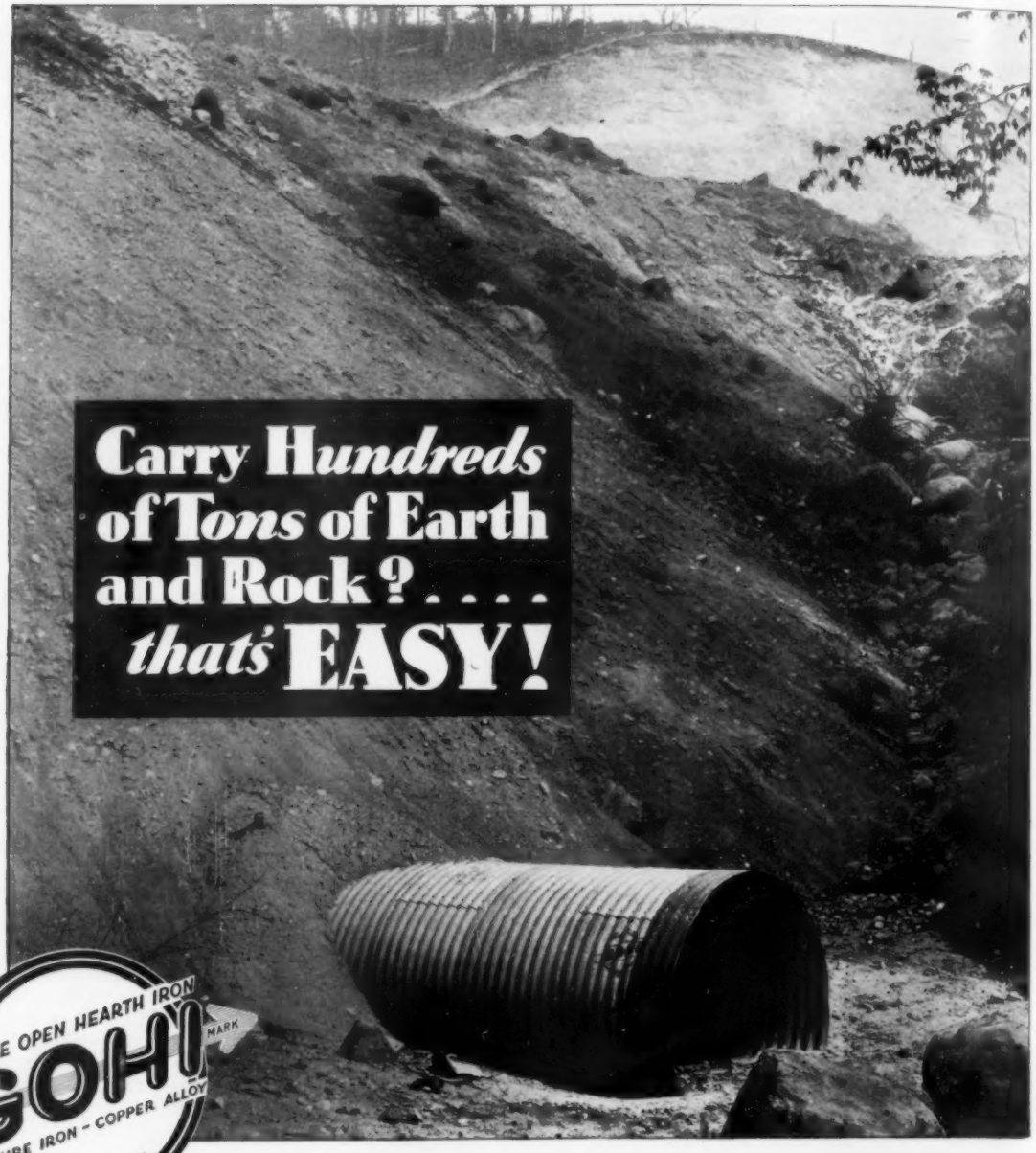
Depression No Excuse for Allowing Zoning Violations

THE Chicago Regional Planning Association is making a special effor to counteract the tendency, observable in many cities under present economic conditions, to bring about a serious relaxation in the enforcement of zoning regulations.

In almost every zoned city and village in the Chicago region during the past two years, requests have been made for special permission to make changes or conduct enterprises in violation of the zoning regulations. In the single-home zone some have wanted to remodel a house into two or more separate apartments, while others have asked permission to build another dwelling on the rear of the lot. Permits have been asked for the operation of wholesale chicken and pigeon raising in the residence zone and one applicant proposed an extensive series of rabbit hutches on his residential lot. Others have attempted to crowd more apartments upon a lot than are allowed by the zoning ordinance and have urged that unless they are permitted to do so the work will not be done and potential jobs for the building trades will not be created.

Some have sought to develop commercial garages, paint shops or repair shops in residential neighborhoods, and others have proposed to establish beauty shops, bakeries, laundries and stores of all kinds in their homes.

"The Chicago Regional Planning Association recommends that unusual care be exercised by zoning authorities in handling such requests," said D. H. Burnham, President of the Association. "Under a ruling by the Illinois Supreme Court the Board of Appeals has no legal power to allow such modifications as actually are violations. To wink at them or to allow them by official action of city councils and village trustees may cause irreparable damage to the neighborhood or the whole community while benefiting only a few, from which it cannot recover when the period of emergency has passed. Such damage would permanently outweigh any temporary benefit that might be gained by a very small number of the people."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During September we hope you will remember to mention THE AMERICAN CITY

MUNICIPAL AND CIVIC PUBLICATIONS

Prices quoted do not include postage, unless so stated.

City Planning

Town Planning in Practice: An Introduction to the Art of Designing Cities and Suburbs.—By Sir Raymond Unwin, F.R.I.B.A. The Century Co., New York. 1932. 416 *pp.* $10.50 *from* THE AMERICAN CITY.

The perennial interest in this town planning classic is evident from the fact that the publishers see in 1932 a demand sufficient for an eighth edition of a book originally published in 1909. The new impression contains nothing later than the second edition preface. But the 310 illustrations are as interesting as ever, and much of Dr. (now Sir Raymond) Unwin's advice on the art of designing cities and suburbs is just as sound and almost as much needed as when originally written.

The chapter headings include: Civic Art as the Expression of Civic Life; The Individuality of Towns, with a Slight Sketch of the Ancient Art of Town Planning; Formal and Informal Beauty; The City Survey; Boundaries and Approaches; Centres and Enclosed Places; The Arrangement of Main Roads, their Treatment and Planting; Site Planning and Residential Roads; Plots and the Spacing and Placing of Buildings and Fences; Buildings, and How the Variety of Each Must Be Dominated by the Harmony of the Whole; Cooperation in Site Planning, and How Common Enjoyment Benefits the Individual; Building Bye-Laws.

Planning and Building the City of Washington.—Published by the Washington Society of Engineers. Edited by Frederick Haynes Newell, Past President of the Society. Ransdell Inc., Washington, D. C. VIII + 264 pp. Illustrated, $2.00 *from* THE AMERICAN CITY. *Founders Edition, autographed by Dr. Newell,* $3.00.

Among the contributions of professional men to the celebration of the George Washington Bicentennial, this effort of the Washington Society of Engineers takes prominent place in appreciation of the ideals and work of George Washington as engineer and city planner. Members of the Society and of the American Institute of Architects and others well equipped for the task have furnished separate chapters.

City Plans

The "Comprehensive Plan of Covington, Kentucky, and Environs," for which L. Segoe, of Cincinnati, was consultant, is a detailed volume of 140 quarto pages, including a ten-year improvement program and plan for financing its execution. The Plan has been approved and adopted by both the City Planning and Zoning Commissions and the legislative bodies of the city and county, and is believed to be the first in the Middle West that includes the zoning of unincorporated areas. (Apply to Mr. Segoe, 35 E. Seventh St., Cincinnati, Ohio.)

The "Comprehensive City Plan — University City, Missouri" was prepared by Harland Bartholomew and Associates. University City, a suburb of St. Louis, has a population of 27,000. The report contains a suggested program for immediate improvement, an outline of the principles of city planning, a brief history of the district and of the City Plan Commission, and the usual sections and appendices on the various phases of the plan and necessary legislation. 98 quarto pp., illustrated. (Apply to the City Plan Commission, University City, Mo.)

Government

Who's Who in Government, Volume II (1932-1933). *The Biographical Research Bureau, Inc., New York.* 1932. 1,308 *pp.* $10 *from* THE AMERICAN CITY.

The 19,612 biographies of Federal, state and municipal officials serving in the United States and its possessions which are included in this useful compilation are listed both alphabetically and geographically by states. State officials are also listed by states according to office. The present volume contains 7,000 more biographies than Volume I, which appeared in 1930.

Unemployment Relief

Emergency Work Relief—As Carried Out in 25 American Communities, 1930-1931, with Suggestions for Setting Up a Program.—By Joanna C. Colcord, Director of the Charity Organization Department, Russell Sage Foundation, assisted by William C. Koplovitz and Russell H. Kurtz. Russell Sage Foundation, New York. 1932. 286 *pp.* $1.50 *from* THE AMERICAN CITY.

This book contains reports on work relief in 25 communities east of the Pacific coast, chosen as representative of the various types of work relief that have been undertaken. It also has sections on "Development of Work Relief" and "Setting Up a Program of Work Relief." A number of selected forms used by work-relief bureaus are reproduced.

A discussion of "Relief—Temporary and Permanent" in Chicago, Ill., is contained in a small pamphlet of 15 pages written by M. S. Szymczak, City Comptroller. "The real solution," Mr. Szymczak believes, "lies in *increasing productive occupation*, and anything that will tend toward aiding the resumption of *building activities* throughout the country will, of course, be one of the most important of all permanent relief measures." He discusses the steps Chicago has taken to reduce taxes and makes concrete suggestions with regard to low-cost housing and its financing. 2c. (Apply to the Municipal Reference Library, 1005 City Hall, Chicago, Ill.)

The President's Organization on Unemployment Relief has issued a 74-page report on "State Legislation for Unemployment Relief," by Rowland Haynes, covering the period from January 1, 1931, to May 31, 1932. It "shows the methods adopted and the safeguards developed where state commissions, or other state bodies, are charged with definite legal responsibility for apportioning supplemental relief funds to local communities." Free. (Apply to the Organization, 1734 New York Ave., Washington, D. C.)

Housing

Three more of the final reports of committees of the President's Conference on Home Building and Home Ownership have appeared. These are volumes V, VI and IX. Volume V is "House Designs, Construction and Equipment"—Reports of the Committees on Design, Construction and Fundamental Equipment (325 pp.); VI is "Negro Housing"—Report of the Committee on Negro Housing (282 pp.); IX is "Household Management and Kitchens"—Reports of the Committee on Household Management and Kitchens and Other Work Centers (228 pp.). $1.15 a volume. (Apply to the President's Conference on Home Building and Home Ownership, New Commerce Bldg., Washington, D. C.)

Traffic

"Report of a Survey of Traffic on the Federal-Aid Highway Systems of Eleven Western States" includes 85 quarto pages and 13 large separate maps. It summarizes the results of an investigation undertaken during the period September, 1929-October, 1930, by the Bureau of Public Roads of the U. S. Department of Agriculture and the Highway Departments of the several states, "in order to obtain essential facts about the present density, type, capacities, and distribution of traffic units as a basis for planning highway developments to serve present and future traffic." Illustrated. (Apply to the Bureau, Washington, D. C.)

City Beautification

Philadelphia is concerned with its appearance, and the Art Jury is authorized to pass on all structures erected on city property. The Twenty-first Annual Report of the Art Jury records its work during 1931, and lists the matters submitted or considered in 1931. 48 pp. (Apply to the Art Jury, Room 121, City Hall, Philadelphia, Pa.)

Highways

The American Road Builders' Association has published multigraphed tabulations of "City Statistics—1932" (21 pp.), compiled by the City Officials' Division of the Association and "County Statistics—1932" (33 pp.), compiled by the County Highway Officials' Division. The former lists cities alphabetically and includes personnel, amount of existing pavement of various kinds, street expenditures for 1931, estimated construction, street expenditures and equipment expenditures for 1932, and purchasing methods. Similar information is given for the counties, which are listed by states. (Apply to the Association, National Press Bldg., Washington, D. C.)

"Importance of Highway Transportation to Economic Recovery," an address by Alfred Reeves, Vice-President of the National Automobile Chamber of Commerce, before the Institute of Public Affairs at the University of Virginia in July, has been published as a booklet by the Chamber. Four pages of data on highway transportation are appended. 16 pp. (Apply to the Chamber, 366 Madison Ave., New York.)

Concrete

The object of the American Road Builders' Association's Bulletin No. 28 on "Concrete Pavements" is "to present data and outline methods by which rational joint spacings in concrete pavements may be determined, and to point out certain construction and maintenance practices that may lead to joint defects." The material is based on data secured by a condition survey of 6,700 miles of concrete pavement in 11 states in various parts of the country. 63 pp. (Apply to the Association, National Press Bldg., Washington, D. C.)

Real Estate Appraisal

"Appraisers' Manual—1932," published by the J. M. Cleminshaw Co., appraisal engineers, is an illustrated handbook for "those who must know where costs and values stand today." The actual costs of new buildings were used in preparing the volume. Section I is devoted to "Land," and Section II, "Building Construction," takes up commercial and industrial buildings and dwellings. 194 pp. (Apply to the J. M. Cleminshaw Co., Cuyahoga Bldg., Cleveland, Ohio.)

Accidents

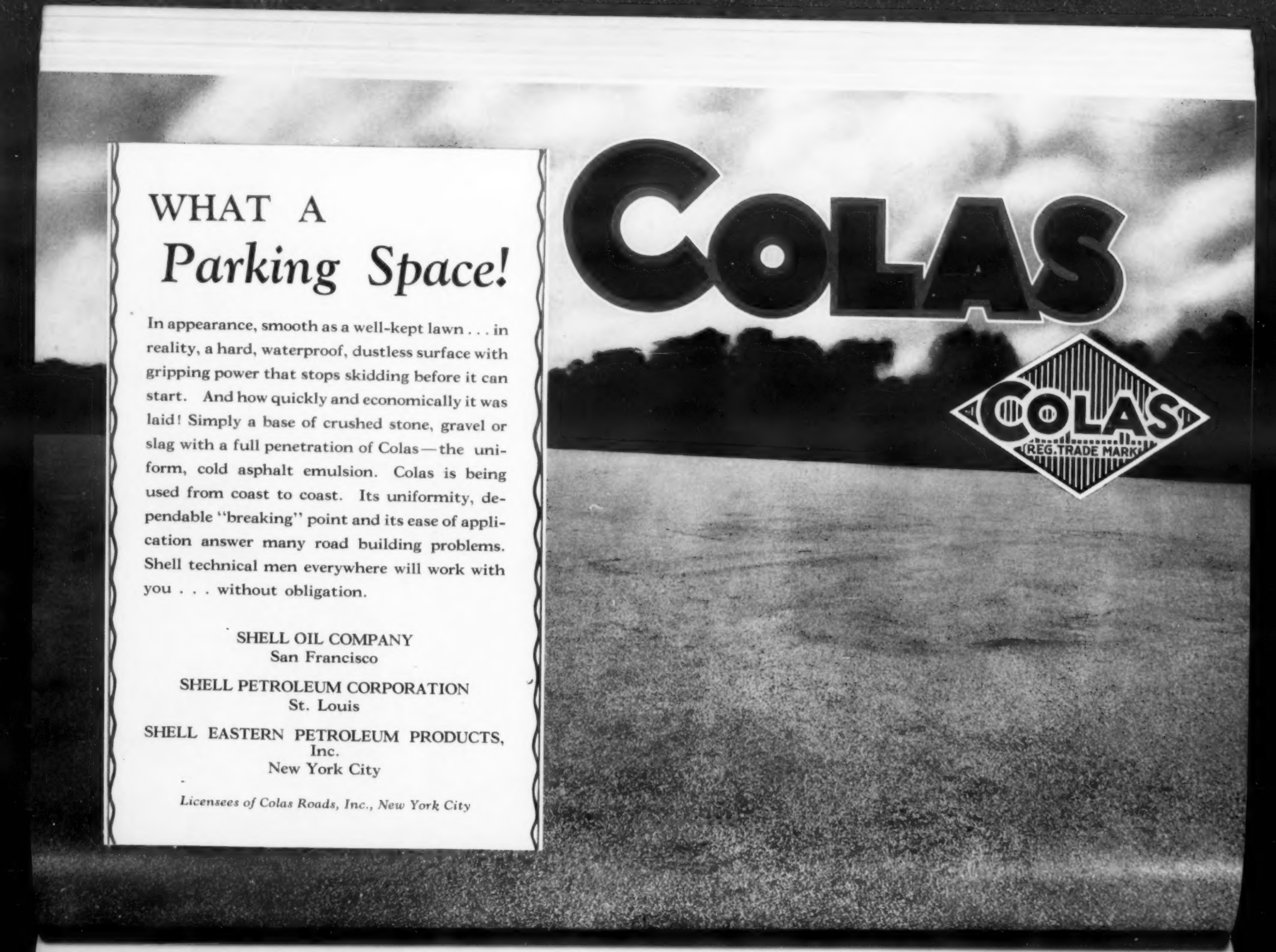
The National Safety Council's annual report, "Accident Facts, 1932," contains statistics for 1931 and previous years for all reported accidents in the United States, including detailed figures of industrial, motor-vehicle, home, public, steam-railway, aviation and student accidents. 62 pp. 25c. (Apply to the Council, 20 North Wacker Drive, Chicago, Ill.)

Playgrounds

The August issue of *Recreation*, publication of the National Recreation Association, contains the first installment of a report on "Surfacing Playground Areas," made by a special committee of eleven recreation executives at the request of the Association because of many inquiries for information on the subject. The report is concluded in the September issue. It is limited to consideration of areas primarily for children's play, and specially surfaced courts used for tennis, handball and similar games. Sections are devoted to important factors to be considered, desirable qualities in a surface, and grouping and classification of the various surfacings being used. Single copies of *Recreation* are 25c. (Apply to the Association, 315 Fourth Ave., New York.)

Airports

Recent publications of the Aeronautics Branch of the U. S. Department of Commerce are "Report of the Committee on Airport Drainage and Surfacing" (38 pp.) and "Airport Management," Bulletin 17 (29 pp.). (Apply to the Aeronautics Branch, Department of Commerce, Washington, D. C.)



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Child Health

Milk Production and Control.—Report of the Committee on Milk Production and Control, White House Conference on Child Health and Protection; H. A. Whittaker, Chairman of the Committee. The Century Co., New York, 1932. XVII + 392 *pp. Charts, tables.* $3.00 *from* THE AMERICAN CITY.

In this volume a full report is given of the study made by the Committee to show the many problems relating to the production of a safe and wholesome supply of market milk, and the progress that has been made in solving them. The section on Public Health Supervision of Milk states the essential elements of municipal milk supervision, and the requirements of effective municipal ordinances or regulations on this matter. It is recommended that, in order that the people may be educated in the importance of adequate milk consumption and that supervision of milk and milk products may become general, the Federal Government institute a coordinated program of education and supervision, and that the states put into operation a program coordinated with the Federal program.

Public Administration

The Public and Its Government.—By Felix Frankfurter, Professor of Law, Harvard Law School. Yale University Press, New Haven, Conn. 1930. 170 *pp.* $2.00 *from* THE AMERICAN CITY.

Under the headings, The Demands of Modern Society upon Government, Does Law Obstruct Government? Public Services and the Public, and Expert Administration and Democracy, Professor Frankfurter analyzes certain outstanding problems of government, commenting upon them in a stimulating and forward-looking way. The third topic includes a penetrating discussion of public utility regulation.

Personnel

Service Ratings.—By J. B. Probst. Bureau of Public Personnel Administration and the Civil Service Assembly of the United States and Canada; 923 East 60th St., Chicago, Ill. 1931. 94 *pp.* $3.60.

This is No. 4 of a series of technical bulletins published jointly by the two organizations named. It represents the result of painstaking investigation and experimentation to develop a reliable means of appraising the service value of employees. The system described was worked out by Mr. Probst, largely in the St. Paul, Minn., city service, and was extensively experimented with through the assistance of the Bureau of Public Personnel Administration and the Spelman Fund.

Architecture

An Architect Muses.—By Wm. Roger Greeley. The Beacon Press, Boston, Mass. 1932. 98 *pp.* $1.60 *from* THE AMERICAN CITY.

An architect's life is a hard one. In times of depression he has little or no work. When he is busy he has his hands full, for to be successful and true to himself he must plan buildings that will please his clients and at the same time be appropriate, distinguished in design, well-constructed and reasonable in cost. He has to contend with the unethical practices of some of his colleagues and to compete with government bureaus and business organizations called architectural companies. Nevertheless architecture is the most essential and enduring of the arts, and offers real satisfaction to its practitioners, including Mr. Greeley, who ruminates philosophically on these matters in this small volume of informal essays. A dry humor and many keen observations make the volume stimulating reading.

Parking

The American Electric Railway Association's mimeographed Bulletin No. 402 is on "Parking Regulations in Cities of More Than 250,000 Population in the United States." The regulations in 29 cities in the United States and two in Canada are analyzed and compared with the similar measures endorsed by the National Conference on Street and Highway Safety in the Model Municipal Traffic Ordinance; this material is supplemented by statistical data on curb and off-street parking facilities and use. 107 pp. $2.50. (Apply to the Association, 292 Madison Ave., New York.)

Public Works Planning

"National and World Planning" is the title of the 180-page section in the July *Annals* of the American Academy of Political and Social Science, which is devoted to the proceedings of the thirty-sixth annual meeting of the Academy, which considered various phases of the subject. The 25 papers are grouped under six headings: Can Capitalism Plan?; Illustrations of Plans; Methods of Planning; Economic Sanctions in International Affairs; Planning Against Unemployment through Public Works; and Guiding the Future. $2.00. (Apply to the Academy, 3457 Walnut St., Philadelphia, Pa.)

Public Works

The fourth of the series of manuals being prepared by the Committee on Uniform Street and Sanitation Records to show how its standard proposals can be applied to cities of various sizes is "Manual of Public Works Records and Administrative Practice for Cities of 50,000 to 200,000 Population, as Installed in Troy, New York." The population of Troy is 75,000. (For an article on "Cost Accounting for Street Sanitation in Troy, N. Y.," by Alfred E. Roche, Commissioner of Public Works, see THE AMERICAN CITY for July, 1932, p. 39.) The report is published jointly by the Committee and the New York State Conference of Mayors and Other Municipal Officials. 102 pp., mimeographed, including many forms and schedules. $1.00. (Apply to the Committee, 923 E. 60th St., Chicago, Ill.

Traffic

"Traffic Circles and Rotary Traffic" and "Safety Islands—Their Design and Use" are the titles of two 5-page illustrated articles in the July issue of *Civil Engineering*. The former article, subtitled "A Solution for the Problems of Congestion at Existing Multiple Street Intersections," is by Herbert S. Swan, city planner, of New York, who explains why he believes that the traffic circle is the most efficient means of caring for traffic at multiple intersections, and why, generally speaking, it is less expensive than a grade separation. The article on safety islands, by D. Grant Mickle, a junior member of the American Society of Civil Engineers and a member of the Traffic Division of the Department of Public Works, Commonwealth of Massachusetts, is based on a study made by the author while he was a Fellow in the Albert Russel Erskine Bureau for Street Traffic Research at Harvard University. *Civil Engineering* is 50c a copy. (Apply to the American Society of Civil Engineers, 20th and Northampton Sts., Easton, Pa.)

A 7-page illustrated pamphlet by Robbins B. Stoeckel, Connecticut State Commissioner of Motor Vehicles, "A Discussion of Speed," takes up the problem offered by the fast speeds of modern cars; the state's attitudes; and various solutions. (Apply to the Dept. of Motor Vehicles, Hartford, Conn.)

Roadside Development

"Four Years Along Connecticut Highways" is the title of a booklet prepared by the Bureau of Roadside Development of the Connecticut Highway Department, describing its activities in highway landscaping, conservation and nurseries, shade tree planting, and public utility pole and shade tree inspection. 28 pp., including a number of photographs. (Apply to the Bureau, State Highway Dept., Hartford, Conn.)

Libraries and Community Buildings

The June number of *The Architectural Forum* contains a 42-page article on "Library Planning and Design," by Edward L. Tilton, of Tilton & Githens, architects, with many photographs and floor plans of large and small libraries throughout the country. The issue also contains an article on "Effective Library Lighting," by Angus S. MacDonald. *The Architectural Record* for July has a 14-page section on libraries, including a portfolio of photographs and plans, and a check-list of library requirements in an article on "The Small Public Library," by Charles G. Loring, architect. The same issue also contains a 7-page "Checking List for Community House Design," by Walter T. Karcher and Livingston Smith, architects. The special reference number of *The Architectural Forum* is $3.00. (Apply to 220 E. 42d St., New York.) *The Architectural Record* is 50c a copy. (Apply to 115 W. 40th St., New York.)

Sewage Disposal

The papers presented at the March meeting of the New Jersey Sewage Works Association are printed in the "Proceedings of the Seventeenth Annual Meeting," and include reports on the operation of plants at Baltimore, Md., Red Bank, N. J., London, Ontario, and Madison-Chatham, N. J. 82 pp. (Apply to the Secretary, John R. Downes, Bound Brook, N. J.)

Water Towers—Police Stations

The June *Bulletin* of the Beaux-Arts Institute of Design contains six drawings and floor plans of police stations which received recognition as best meeting the conditions prescribed in a recent competition for the design of a small police station in a suburban community. Six designs for a decorative water tower, selected in another contest, are also reproduced. The *Bulletin* is 35c a copy. (Apply to 304 E. 44th St., New York.)

Fire Fighting

The 59th Annual Convention of the International Association of Fire Chiefs, held in Havana, Cuba, October 14-17, 1931, is reported in a 185-page volume of Proceedings, which contains noteworthy addresses on the education of firemen, incendiarism, inspection work, present-day trends in fire protection, floodlighting, estimating losses, holiday fire hazards, assistance to neighboring localities, etc. (Apply to the Secretary-Treasurer, Jas. J. Mulcahey, 16 Franklin Ave., Yonkers, N. Y.)

Zoning

A revised edition of the National Municipal League's pamphlet on "Zoning," by Edward M. Bassett, Counsel, Zoning Committee of New York, has just been issued. Mr. Bassett, an outstanding authority, describes the growth of the zoning movement and presents the reasons for zoning, the experiences of various zoned cities, the correct principles and best practice, the legal pitfalls and a selected list of references. 31 pp. 25c. (Apply to the League, 309 East 34th St., New York.)

Transportation

The Denver Planning Commission has issued Volume 3 of The Denver Plan, "A Study for Mass Transportation." Existing conditions are surveyed, and proposals are made for changes and extensions. 39 pp., including maps. (Apply to the Commission, 810 14th St., Denver, Colo.)

Other Reports Received

ALLIANCE, NEBR.—Annual Report, 1931. 42 pp.

BRIGHTON, HOVE AND DISTRICT, SUSSEX, ENGLAND.—Report on the Regional Planning Scheme, 1932, in two parts. 78 and 49 quarto pp.

CAMBRIDGE, MASS.—Annual Report, Water Board, 1931. 50 pp.

CHICAGO, ILL.—Annual Report, Board of Supervising Engineers, Chicago Traction, for fiscal year ended January 31, 1932. 127 pp.

CHICAGO, ILL.—Manual and General Information in regard to the Chicago Civil Service, 1932. 24 pp.

CHICAGO, ILL.—Annual Report, Retirement Board, Policemen's Annuity and Benefit Fund, 1931. 23 pp.

CONCORD, N. H.—Annual Report, Board of Water Commissioners, 1931. 22 pp.

CONNECTICUT.—A Survey of Motor-Vehicle Traffic in Connecticut in 1931, by the Department of Motor Vehicles. 46 pp.

EASTON, PA.—Annual Report, 1931. 109 pp.

NEW ORLEANS, LA.—Annual Report of Operations, Division of Public Works, 1931. 30 pp., mimeographed.

NEWTON, MASS.—Annual Report, Street and Engineering Departments, 1931. 39 pp.

PITTSBURGH, PA.—"Civic Pittsburgh, 1931-1932—Facts and Figures about Your Business," by J. C. Slippy. 20 pp. 50c.

PROVIDENCE, R. I.—Annual Reports, City Plan Commission, 1929-1931. 42 pp.

RHODE ISLAND.—Annual Report, Board of Purification of Waters, 1931. 14 pp.

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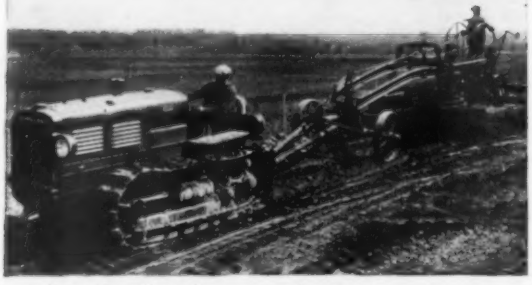

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CONVENTIONS—WHEN AND WHERE

(Figures in parentheses following the name of the convention city indicate the estimated attendance other than local)

SEPTEMBER 12-14.—DIGBY, N. S. (250)
Canadian Good Roads Association. Annual convention. Secretary-Treasurer, George A. McNamee, New Birks Building, Montreal, Que.

SEPTEMBER 13-16.—ST. LOUIS, MO.
International Association of Municipal Electricians. Annual convention. Secretary, W. H. Harth, Columbia, S. C.

SEPTEMBER 14-16.—GARY, IND. (500)
Municipal League of Indiana. Annual convention. Executive Secretary, S. E. Spurgeon, Municipal League Review, Kokomo, Ind.

SEPTEMBER 15-16.—ST. CLOUD, MINN. (75)
American Water Works Association—Minnesota Section. Annual meeting. Secretary-Treasurer, Ronald M. Finch, 240 South Fourth Street, Minneapolis, Minn.

SEPTEMBER 15.—SALEM, N. H. (200)
Joint meeting. Massachusetts Highway Association, Secretary, John M. McCarthy, 318 State House, Boston, Mass.; *New Hampshire Good Roads Association,* Secretary, Frank D. Sleeper, Laconia, N. H.

SEPTEMBER 18, WEEK OF.—WASHINGTON, D. C.
Annual meetings. American Civic Association, Inc., Executive Secretary, Harlean James, Union Trust Building, Washington, D. C.; *American Institute of Park Executives and the American Park Society,* Executive Secretary, William H. Walker, 224 Wakewa Avenue, South Bend, Ind.; *American Association of Zoological Parks and Aquariums,* Secretary, Roger Conant, Toledo Zoological Park, Toledo, Ohio.
The National Conference on Government (listed below) will meet in conjunction with these organizations.

SEPTEMBER 18, WEEK OF.—WASHINGTON, D. C.
National Conference on Government, a combination of the annual meetings of the following organizations: *National Municipal League,* Secretary, Russell Forbes, 309 East 34th Street, New York; *Proportional Representation League,* Executive Secretary, George H. Hallett, Jr., 311 South Juniper Street, Philadelphia, Pa.; *National Association of Civic Secretaries,* Secretary, H. Marie Dermitt, Hotel William Penn, Pittsburgh, Pa.; *American Legislators' Association,* Director, Hon. Henry W. Toll, 850 East 58th Street, Chicago, Ill.

SEPTEMBER 19-21.—GRAND RAPIDS, MICH. (250)
International Association of Electrical Inspectors—Western Section. Annual meeting. Secretary, William S. Boyd, 175 West Jackson Boulevard, Chicago, Ill.

SEPTEMBER 20-21.—SWAMPSCOTT, MASS. (300)
Massachusetts Police Association. Annual convention. Secretary, John H. Shaughnessy, West Newton, Mass.

SEPTEMBER 21-24.—BALTIMORE, MD. (75)
Civil Service Assembly of the United States and Canada. Annual convention. Secretary, Fred Telford, 923 East 60th Street, Chicago, Ill.

SEPTEMBER 22-23.—ERIE, PA.
American Water Works Association—Central States Section. Annual convention. Secretary, B. J. Lechner, Water Department, Erie, Pa.

SEPTEMBER 26-28.—WASHINGTON, D. C. (100)
American Association of Engineers. Annual convention. Secretary, M. E. McIver, 8 South Michigan Avenue, Chicago, Ill.

SEPTEMBER 26-29.—SAN DIEGO, CALIF. (1,000)
Joint meeting. California Conference on City Planning, Secretary, C. J. S. Williamson, Chamber of Commerce, Los Angeles, Calif.; *League of California Municipalities,* Acting Secretary-Manager, Gordon Whitnall, 1095 Market Street, San Francisco, Calif.

SEPTEMBER 26-27.—SAN DIEGO, CALIF. (100)
California Sewage Works Association. Annual convention. Secretary, Professor E. Reinke, University of California, Berkeley, Calif.

SEPTEMBER 26, WEEK OF.—SWAMPSCOTT, MASS.
Illuminating Engineering Society. Annual convention. General Secretary, E. H. Hobbie, 29 West 39th Street, New York.

SEPTEMBER 26-27.—COFFEYVILLE, KANS.
Kansas Association of Municipal Utilities. Annual convention. Secretary-Treasurer, L. C. Angevine, Water and Electric Department, McPherson, Kans.

SEPTEMBER 26-28.—MINOT, N. DAK.
North Dakota Water and Sewage Works Conference. Annual meeting. Secretary-Treasurer, A. L. Bavone, Bismarck, N. Dak.

SEPTEMBER 27-30.—SPRINGFIELD, MASS.
Joint meeting. New England Water Works Association. American Water Works Association—New York Section. Secretary of N. E. W. W. A., Frank J. Gifford, 715 Tremont Temple, Boston, Mass. Secretary-Treasurer of the A. W. W. A., N. Y. Section, R. E. Blanchard, 50 East 42nd Street, New York.

SEPTEMBER 29-OCT. 1.—PITTSBURGH, PA. (150)
International Association of Public Works Officials. Annual convention. Secretary, A. M. Anderson, 100 North LaSalle Street, Chicago, Ill.

SEPTEMBER 30-OCT. 1.—ST. GEORGE, UTAH. (400)
Utah State Municipal League. Annual convention. Secretary-Treasurer, F. K. Nielsen, Price, Utah.

OCTOBER 3-7.—WASHINGTON, D. C. (5,000)
National Safety Council. Annual congress. Managing Director, W. H. Cameron, 20 North Wacker Drive, Chicago, Ill.

OCTOBER 5-8.—ATLANTIC CITY, N. J. (1,000)
American Society of Civil Engineers. Fall meeting. Secretary, George T. Seabury, 33 West 39th Street, New York.

OCTOBER 5-6.—OSHKOSH, WIS. (250)
Wisconsin Chiefs of Police Association. Annual meeting. Secretary, R. H. McCarty, Police Department, Kaukauna, Wis.

OCTOBER 6-7.—ROCKFORD, ILL. (350)
Illinois Municipal League. Annual convention. Secretary, A. D. McLarty, Urbana, Ill.

OCTOBER 6-7.—ASBURY PARK, N. J. (500)
New Jersey State League of Municipalities. Annual convention. Executive Secretary, Barrett L. Crandall, 34 West State Street, Trenton, N. J.

OCTOBER 10-11.—MINOT, N. DAK. (75)
League of North Dakota Municipalities. Annual meeting. Executive Secretary, Myron H. Atkinson, Bismarck, N. Dak.

OCTOBER 10-13.—FORT WORTH, TEXAS. (300)
Southwest Water Works Association. Annual convention. Secretary-Treasurer, Lewis A. Quigley, Fort Worth, Texas.

OCTOBER 11-12.—APPLETON, WIS. (100)
American Water Works Association—Wisconsin Section. Annual convention. Secretary, L. A. Smith, Supt. of Water Works, Madison, Wis.

OCTOBER 12-14.—LANSING, MICH. (350)
Michigan Municipal League. Annual meeting. Director, Harold D. Smith, University of Michigan, Ann Arbor, Mich.

OCTOBER 12-13.—SULLIVAN, MO. (50)
League of Missouri Municipalities. Annual convention. Executive Secretary, J. W. Lumpp, 6801 Delmar Boulevard, University City, Mo.

OCTOBER 12-13.—BROKEN BOW, NEBR. (500)
League of Nebraska Municipalities. Annual convention and School for City Officials. Secretary-Treasurer, C. E. Beals, 407 East 12th Street, Crete, Nebr.

OCTOBER 13-14.—COLUMBUS, OHIO. (125)
Ohio Conference on Sewage Treatment. Annual convention. Secretary-Treasurer, G. E. Flower, Southerly Sewage Plant, Cleveland, Ohio.

OCTOBER 17.—BRIDGEPORT, CONN.
New England Sewage Works Association. Fall meeting. Secretary, F. W. Gilcreas, 14 Beacon Street, Boston, Mass.

OCTOBER 18-19.—NEW YORK.
Conference on Planning, Government and Administration in Metropolitan Regions. Director, Alison Reppy, New York University, Washington Square East, New York.

OCTOBER 18-21.—SAN DIEGO, CALIF. (800)
International Association of Fire Chiefs. Annual convention. Secretary, James J. Mulcahey, Yonkers, N. Y.

OCTOBER 19-21.—LAWRENCE, KANS. (250)
League of Kansas Municipalities. Annual convention. Executive Secretary, John G. Stutz, Lawrence, Kans.

OCTOBER 19-21.—ATLANTIC CITY, N. J. (300)
Pennsylvania Water Works Association. Annual meeting. Secretary, F. S. Purviance, 327 Telegraph Building, Harrisburg, Pa.

OCTOBER 19-20.—CHARLOTTESVILLE, VA. (250)
League of Virginia Municipalities. Annual convention. Executive Secretary, Morton L. Wallerstein, 408 Travelers Building, Richmond, Va.

OCTOBER 22-24.—WASHINGTON, D. C. (30)
Conference of State Sanitary Engineers, Annual meeting. Secretary-Treasurer, R. E. Tarbett, U. S. Public Health Service, Washington.

OCTOBER 23-26.—MEMPHIS, TENN.
National Association of Commercial Organization Secretaries. Annual convention. Secretary-Treasurer, J. H. Hott, Association of Commerce, Fort Worth, Texas.

OCTOBER 24-27.—WASHINGTON, D. C.
American Public Health Association. Annual meeting. Acting Executive Secretary, Dr. Kendall Emerson, 450 Seventh Avenue, New York.

OCTOBER 24-26.—DENVER, COLO. (100)
American Water Works Association—Rocky Mountain Section. Annual meeting. Secretary-Treasurer, Dana E. Kepner, 226 Continental Oil Building, Denver, Ohio.

OCTOBER 24-26.—CINCINNATI, OHIO.
Joint conference. International City Managers' Association, Executive Director, Clarence E. Ridley, 923 East 60th Street, Chicago, Ill.; *Governmental Research Association,* Secretary-Treasurer, D. H. Smith, Institute for Government Research, 722 Jackson Place, Washington, D. C.

OCTOBER 25-27.—SIOUX CITY, IOWA. (100)
American Water Works Association—Missouri Valley Section. Annual meeting. Secretary, Earl L. Waterman, University of Iowa, Iowa City, Iowa.

OCTOBER 25-27.—AMES, IOWA.
Iowa Sewage Treatment Conference. Iowa Waste Disposal Association, Joint meeting. Secretary of the Conference, Lindon J. Murphy, Iowa State College, Ames, Iowa.

OCTOBER 26-29.—CORONADO BEACH, CALIF. (500)
American Water Works Association—California Section. Annual convention. Secretary-Treasurer, R. F. Brown, P. O. Box 506, Stockton, Calif.

OCTOBER 31—NOVEMBER 2.—WINSTON-SALEM, N. C.
Joint meeting. American Water Works Association—North Carolina Section and *North Carolina Sewage Works Association.* Secretary, Professor H. G. Baity, University of North Carolina, Chapel Hill, N. C.

NOVEMBER 10-12.—CHICAGO, ILL. (100)
American Municipal Association. Annual meeting. Executive Secretary, Paul V. Betters, Drexel Avenue at 58th Street, Chicago, Ill.

NOVEMBER 14-18.—WASHINGTON, D. C. (400)
American Association of State Highway Officials. Annual convention. Executive Secretary, W. C. Markham, 1222 National Press Building, Washington, D. C.

NOVEMBER 14-18.—NEW ORLEANS, LA. (200)
American Society of Municipal Engineers. Annual convention. Secretary, C. W. S. Sammelman, 4359 Lindell Boulevard, St. Louis, Mo.

NOVEMBER 14-16.—PITTSBURGH, PA.
National Conference on City Planning. Secretary, Flavel Shurtleff, 130 East 22d Street, New York.

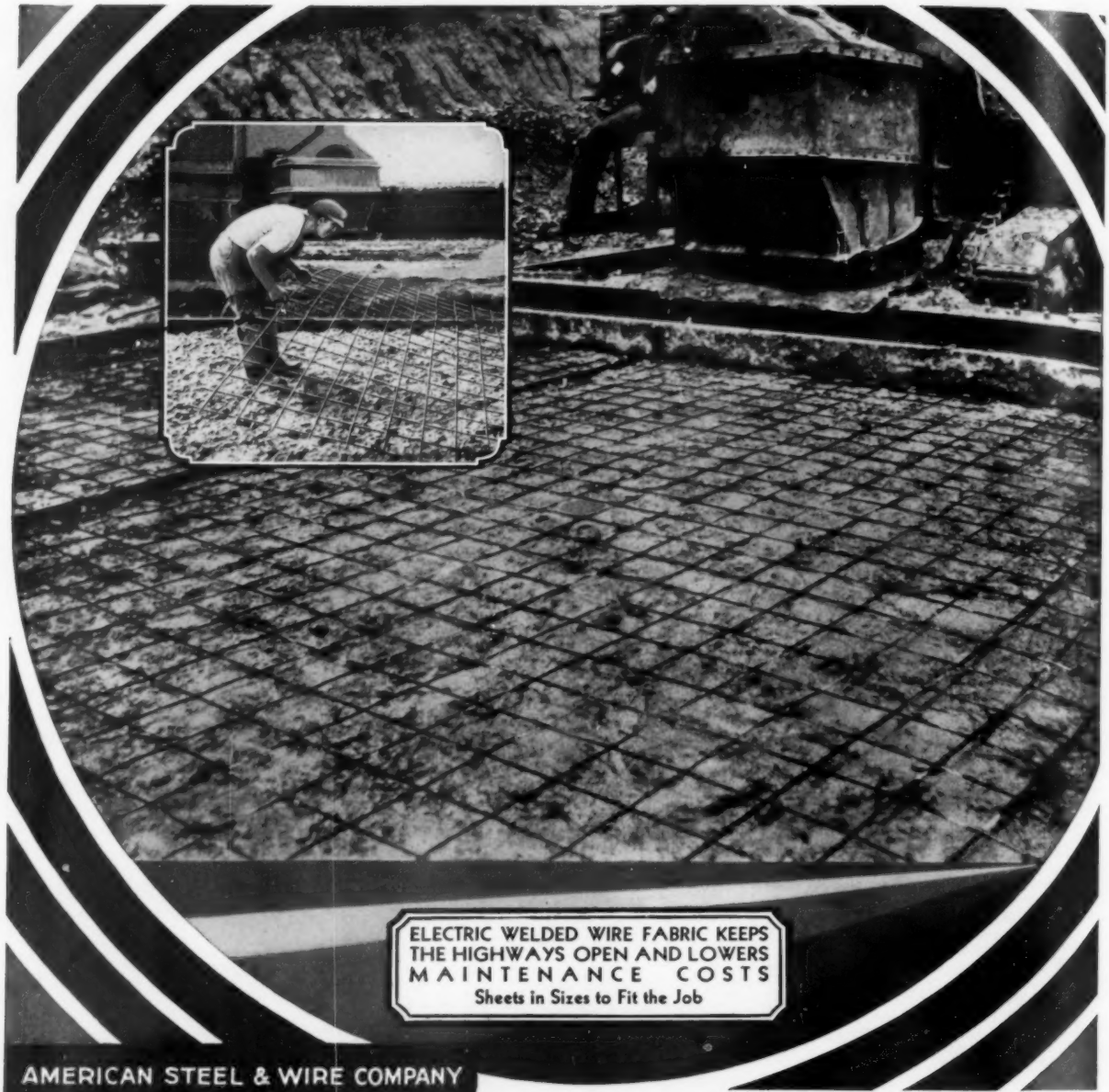
DECEMBER 5, WEEK OF.—NEW YORK.
American Association of Pools and Beaches, Inc. Convention. Executive Secretary, Lyle L. Jenne, 725 Bulletin Building, Philadelphia, Pa.

DECEMBER 5-9.—NEW YORK.
American Society of Mechanical Engineers. Annual convention. Secretary, C. W. Rice, 29 West 39th Street, New York.

DECEMBER 5, WEEK OF.—NEW ORLEANS, LA.
The Asphalt Institute. Annual Asphalt Paving Conference. Managing Director, J. E. Pennybacker, 801 Second Avenue, New York.
Association of Asphalt Paving Technologists. Meeting in conjunction with the annual Asphalt Paving Conference. Secretary-Treasurer, C. A. Mullen, 980 Saint Antoine Street, Montreal, Que.

JANUARY 16-23.—DETROIT, MICH.
Highway and Building Congress. (See p. 87.)

JUNE 12-16.—CHICAGO, ILL. (1,200)
American Water Works Association. Annual convention. Secretary, Beekman C. Little, 29 West 39th Street, New York.



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NEWS AND ILLUSTRATIONS

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

Concrete Duplex Bottom for Rapid Sand Water Filters

A concrete duplex filter bottom for use in all types of concrete water filters has recently been announced by the F. B. Leopold Co., Inc., 422 First Avenue, Pittsburgh, Pa. This system is built of concrete materials throughout, with porcelain nozzles, which makes the design similar to natural underground watercourses, in that no materials which come in contact with water will rust out or become coated. The system consists principally of a concrete header flume of sufficient size for a man to enter and work in, and from this header flume concrete laterals are built on either side. In the tops of these laterals glazed porcelain nozzles are cast in place, then the header flume is covered by a concrete slab into which are cast the porcelain nozzles. The laterals are cast 12 inches on centers, and the nozzles are set in the laterals and flume slab 8 inches on centers, to form the primary distributing system.

On top of the primary system are set the secondary blocks, which are precast in metal forms and then after being cured are placed in the filter. The blocks are made about 12 inches wide by 24 inches long and are interlocking. Holes are placed 1¼ inches on centers each way. These secondary blocks tend to divide the filter bed into sections of 2 square feet each. The small perforations in the blocks, being placed close together and also very close to the filter walls, complete the distributing system. When washing the filter, the water is distributed uniformly over the entire bed, and also when the filters are operating, water is underdrained uniformly throughout.

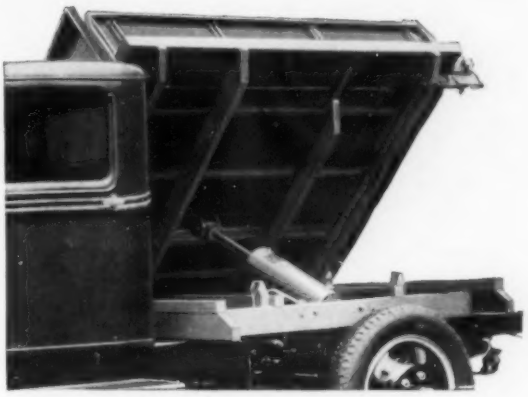
This system requires only a 6-inch depth of filter gravel over the secondary blocks, and the gravel need not be larger than ¾-inch. This does away with the difficulty and cost of securing a good quality of larger filter gravel and grading it properly.

This system was designed and put into actual service during the early part of 1926 and has shown its reliability since its first installation, for a total of 60,000,000 gallons daily filter capacity has been installed and at present over 20,000,000 additional capacity is under construction.

A Crane Unit for Municipal Yards

A portable crane capable of handling 4,500 pounds and mounted on either a Case or a McCormick-Deering tractor is available in the Loadmaster crane manufactured by the Bucyrus-Erie Co., Department L-90, South Milwaukee, Wis. This Loadmaster, with its increased capacity, has a wide variety of uses. It can be used as a stationary revolving-boom crane, as a crane traveling with its load, or as a tractor. Its mobility, compactness and items of special equipment available make it handy for both indoor and outdoor work.

It lifts and swings and carries loads to points where needed. It will load and unload trucks and cars, sort and pile stored material, lift rock, pipe and transformers from and into manholes and trenches, serve machine tools, and assist in overhauling and in repair work. It is furnished with either wheel or crawler mounting.



THE NEW MODEL 36 UB ST. PAUL SPECIAL SIDE-DUMP BODY

A New Side-Dump Body

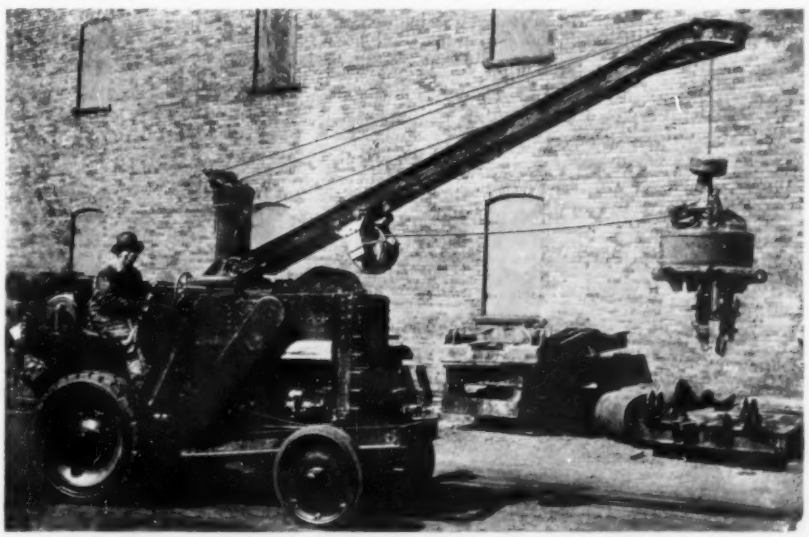
A 1½-cubic-yard side-dump body which is particularly desirable for road maintenance and which can be converted from a body for carrying material to a flat-bed body quickly has been announced by the St. Paul Hydraulic Hoist Co., St. Paul, Minn. The side-dump features of the St. Paul special 36UB hoist and Type 459 body speed up work and eliminate maneuvering on highway work and blocking traffic. It is built with wood sills for cushioning and quieting the body, has a stationary pump with no flexible hose and has sides removable and a tailgate which can be lowered flush, forming a platform body convenient for carrying equipment. The body has a capacity of 1½ to 2 cubic yards and dumps to one side only. It has a high dumping angle.

A New Colas Factory

Shell Eastern Petroleum Products, Inc., 122 E. 42nd Street, New York City, has announced the tenth Colas factory to be completed under the license of Colas Roads, Inc. The new factory is located at Boston, Mass., and will assist the existing factory at Rutherford, N. J., in supplying the requirements of New England.

Earle Joins Decarie Sales Staff

The D-N Corporation and Decarie Incinerator Corporation, 155 East 44th Street, New York, have announced that Ralph D. Earle, Jr., has joined their sales staff. Mr. Earle was formerly Manager of the Incinerator Department of the Pittsburgh-Des Moines Steel Co., at its New York office.



THE LOADMASTER CRANE HANDLING CASTINGS IN A MUNICIPAL YARD
YARD

-'way back in 1888

—a year famous for the big blizzard—the defeat of Grover Cleveland for the presidency—the shutting off of Chinese immigration—and the re-surfacing of Bryden Road, Parsons Avenue to Twenty-second St., Columbus, Ohio, with Trinidad Sheet Asphalt.

• • • •

That pavement was put down just forty-four years ago and the lake asphalt which was used to re-surface the old cobblestone pavement is still in service. Here and there you'll find a patch but it is a truly remarkable testimonial to Trinidad Lake Asphalt to find that this street has given such long service with comparatively low maintenance costs.

Bryden Road has been subjected to increasingly heavy traffic every year. Just to give you an idea of the traffic passing over this street it will be interesting to note that a count taken recently showed that more than 11,000 motor cars and trucks passed the intersection of Bryden Road and Parsons Ave. in thirteen hours.

You can get long-life, low maintenance streets by specifying Trinidad Lake Asphalt . . . the asphalt that is different . . . the only asphalt with a naturally occurring colloidal filler which is a contributing factor to the long life of millions of square yards of Trinidad Lake Asphalt streets and roads throughout the United States and foreign countries.

Write for complete information regarding the remarkable record of Trinidad Lake Asphalt pavements.

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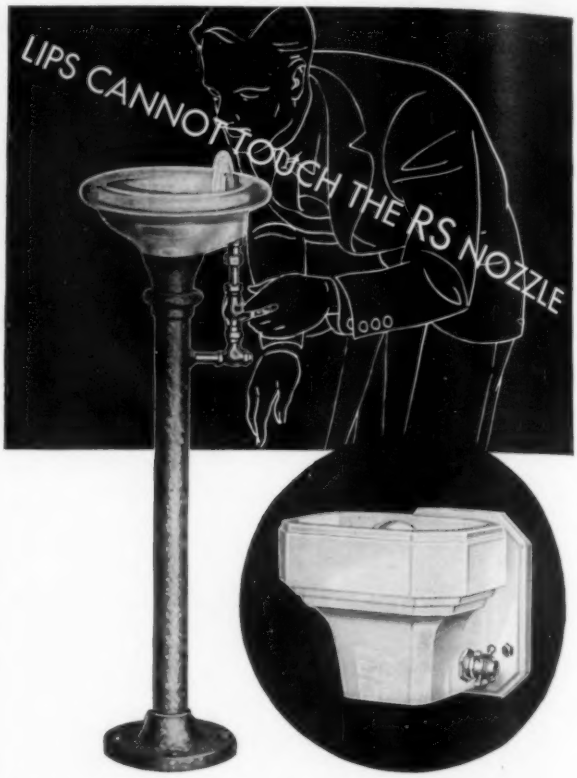
MORE THAN A BUBBLER

—every drink is a Sanitary one



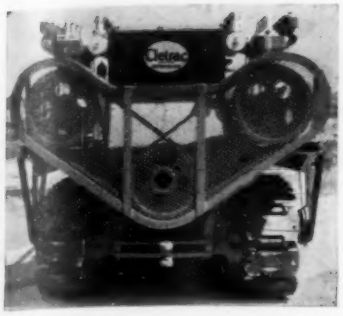
Everywhere—in public buildings, parks and wherever people gather—the drinking fountain is the common meeting place. Therefore, consideration should be given the type of fountain. Remember it is humanly economical to install the Rundle-Spence . . . the fountain with unusual sanitary advantages.

The R-S Vertico-Slant fountain design makes it impossible for the user to touch his or her lips to the nozzle. Water spouts slantingly from jet to mouth, the excess falling into the bowl and not on the jet. Only the R-S fountains have Vertico-Slant health-guarding features. Send for catalog.

RUNDLE-SPENCE MFG. CO.

446 No. Fourth Street Milwaukee, Wisconsin

RUNDLE-SPENCE



END VIEW OF THE DAVEY-CLETRAC UNIT

A Tractor-mounted Air Compressor

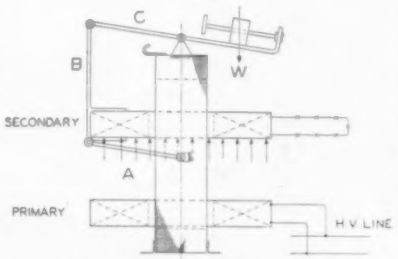
A heavy-duty air compressor mounted on a Model 80 Cletrac tractor in such a way that it does not interfere with the drawbar work of the tractor has been announced by the Davey Compressor Co., Kent, Ohio. Two 4-cylinder Davey air-cooled compressors, with a combined displacement of 640 cubic feet per minute, are mounted tandem and are connected with drive sheaves by independent sets of V-type belts. A 4-inch diameter-treated chrome nickel steel shaft 94.5 inches long extending through the tractor serves to carry directly the dead weight of the compressors, and to relieve the tractor transmission case of the strain of the load.

The compressors are largely of aluminum and weigh but 725 pounds each. Vibration is reduced by this type of construction and by the precise counterweighted crankshaft and large bearing areas. By putting the weight of the compressor over the tracks and near the seat, the equilibrium of the machine is so well established that it will operate successfully at an angle of 40 degrees in any direction. Such additional parts as supporting brackets, air receivers, sheaves, etc., are located so as to lower the center of gravity, and thereby also help to reduce slippage by increasing traction where the ground surface is hard and smooth. On the basis of the calculation of air deliveries, the new Davey-Cletrac unit will operate the following tools at 640 feet: 10 cement breakers, 8 rotary jackhammers, 6 rotary rock drills, 16 clay diggers, 24 tie tampers, 14 riveting hammers, 10 timber saws, 10 pile drivers or 42 paint sprays.

Street-Lighting Transformers Improved

Improvements in the operating characteristics, particularly those which affect lamp life, are consistent with the ever-increasing use of oil-immersed, moving-coil types of constant-current transformers. The use of a novel mechanism to give parallel motion to the moving coil in the LP pole-type constant-current regulating transformer of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has permitted the development of oil-immersed units which are light, are of rugged simplicity, and have a surprising constancy of ampere output. The compactness of design attained with the new mechanism is evident from the view of the transformer out of its tank.

The schematic diagram shows the secondary coil, rigidly clamped to vertical member B, as a dead weight on one end of the rocker arm C. The balancing moment of the counterweight W is adjusted to be less than the moment of the dead weight of the coil. When the transformer is in operation, the currents in the opposing coils exert a force which diverts a part of the flux from the iron circuit into a return path including the space between the coils. The secondary, or load, current reacts with the leakage flux to produce an upward, electro-mechanical force (proportional to the square of the current) which is transmitted through the coil and link B to the rocker arm or link C. The moment of the coil repulsion force adds to that of the counterweight so that, if W is properly adjusted, the moment of the coil weight will be overcome. The coil will then come to rest at that position which will allow all the primary flux to leak between the coils except the flux necessary



SCHEMATIC DIAGRAM OF THE LP REGULATING TRANSFORMER

to create the secondary voltage required to force rated current through the load impedance.

The coil repulsion forces, for a constant load current, are practically independent of the position of the coil. If the mechanism which controls the motion of coil and amplifies the coil repulsion forces can be designed to be independent of the coil position also, one, and only one, value of the current will be possible when the system is in equilibrium. Several features of the parallel-motion mechanism cause it to approach this ideal.

The coil weight is borne by the single, always vertical, practically constantly loaded link B. Auxiliary link A is essentially a guide for the coil and carries negligible weight. The simple loading on one end of the rocker arm permits an equally simple counter-balancing device on the other end. In this case, a single weight is moved in or out along the rocker arm with micrometer precision by turning the hand grip at one end of a threaded rod which is tapped through the weight. Ball-bearings are used at all load-carrying supports of the mechanism.

The net result of the new and simplifying features embodied in this new design is the attainment of the simplest and most ideal of all regulation curves—the horizontal straight line. The variation from rated secondary current permissible on the superseded design was plus or minus 1 per cent.

Lovell Is Resident Engineer

Our attention has been called to an error in the name of the Resident Engineer at Newnan, Ga., mentioned in the article, "Resurfacing a Main Thoroughfare," appearing on pages 41-44 of the July, 1932, issue of THE AMERICAN CITY. J. W. Lovell was Resident Engineer for the State Highway Board of Georgia on this project.

Sewage Pumping Equipment for Chicago World Fair

One of the problems faced by the management of A Century of Progress, Chicago's 1933 World Fair, was the collection and disposal of sanitary sewage. The contract for furnishing, installing and operating all necessary sewage pumping equipment for the duration of the Fair has been awarded to Yeomans Brothers Co., Chicago, Ill. The contract comprises four underground automatic electric pumping stations each containing three direct-connected non-clogging vertical-shaft centrifugal units varying in capacity from 1,300 to 5,700 gpm. These stations will collect the sanitary sewage from all the structures in the fair grounds and deliver it into the city sewers, which are at a slightly higher elevation than those within the grounds.

A Maintainer and Rebuilder of Oiled Roads

A road disc which is designed to cut the surface of old oiled roads and do away with washboards, and can be used for cutting up sod on grassy road shoulders, for discing earth fills on grading, for mixing materials on retread jobs and for making and maintaining sand-clay roads, has been announced by the Baker Manufacturing Co., Springfield, Ill. The Baker Model 80 road disc has 24 discs, 6 in each gang. They are 20 inches in diameter and 5/16-inch thick, being made of special heat-treated alloy steel for long wear. The machine cuts 7 feet wide, and the discs may be forced 5 inches below the level of the wheels of the machine and may be lifted 10 inches above the surface. The machine weighs 4,850 pounds and requires a 20-horsepower tractor or larger size, depending on the depth of penetration necessary.

THE NEW BAKER ROAD DISC IN ACTION

SINCE 1867

COLDWELL

Above: Coldwell "L-Twin" motor lawn mower and roller. Mows and rolls simultaneously 4 to 6 acres a day on one gallon of gasoline. With gang units attached it cuts a 60-inch swath, ten acres a day on one gallon of gasoline.

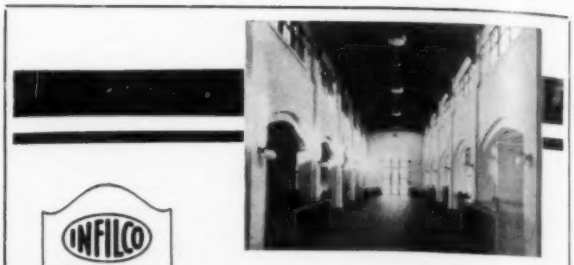
Economical and Dependable Lawn Mowing Equipment

THE Coldwell "L-Twin" is a compact and flexible unit capable of doing all the trimming—then when equipped with the extra gang units its capacity is more than doubled. Large capacity is combined with flexibility. The entire outfit is simple and economical to operate, strongly built and dependable. Models of greater or less capacity are available. Full particulars on request.

COLDWELL LAWN MOWER CO., NEWBURGH, NEW YORK, U. S. A.

In Canada—Taylor-Forbes Co., Ltd., Guelph

Manufacturers of ***DEPENDABLE*** *Lawn Mowers*—HAND, HORSE, GASOLINE ELECTRIC



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Automatic Boiler Blowdown
Beam Level Controllers
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Hot-Flow Water Softeners
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Lime-Soda Water Softeners
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Proportioning Equipment
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Swimming Pool Filters and Equipment
Sterilizers
Taste and Odor Removal Plants
Venturi Tubes and Infilco Meters
Water Stills
Wet Chemical Feeders
Zeolite Water Softeners

In Step with Modern Methods

FIFTY years has seen the rapid sand filter plant pass through so many stages of refinement and elaboration it is difficult to realize that the modern water purification plant came from such humble beginnings.

But the reasons for this remarkable progress are not hard to find. The water-works engineer has continually encouraged new equipment and new methods to further improve water quality—and has been willing to adopt improvements immediately upon their development.

International is proud of its reputation of being first to introduce and adopt improvements—first to discard features that have proven to be hindrances of progress. And by continued research and development International Water Purification Equipment will maintain its leadership year after year.

International Filter Co.
Water Softening and Filtration Plants
General Offices
50 East Van Buren Street, Chicago

INTERNATIONAL

Install Stewart Fence

When Fencing questions arise, consult Stewart's 4 pages of Fence specifications in the Municipal Index for reliable data.

And always — ALWAYS —get Stewart to figure on your requirements for Wrought Iron and Chain Link Wire Fences.

The Stewart Iron Works Co., Inc.
813 Stewart Block
Cincinnati, O.

Stewart IRON AND WIRE FENCES

JOSLIN
Street Signs

10 POINTS of SUPERIORITY

1—Easily read
2—Weather proof
3—Unaffected by atmosphere
4—Do not chip, crack or break
5—Rigid construction and assembly
6—Du Pont Duco finish
7—Copper Bearing Galvanized Steel
8—Galvanized Steel Parts
9—99.4% pure aluminum
10—10-Year guarantee

For further information consult THE MUNICIPAL INDEX.

Send for literature and prices.

A. D. Joslin Mfg. Co., Merchandise Mart, Chicago, Ill.

THE NEW AND LARGER TRACTRACTOR

A New 40-Hp Crawler Tractor

A new crawler tractor which develops a maximum drawbar horsepower of 40 and a maximum engine horsepower of 52 has been announced by the International Harvester Co., 606 South Michigan Ave., Chicago, Ill., in its Model T-40 6-cylinder TracTracTor. This unit is suited for heavy construction such as road, dam, levee, irrigation and oil-field work, logging etc., and particularly for the operation of bulldozers, backfillers, shovels and snow-plows and pulling crawler wagons, scrapers, graders, and other road equipment.

Accessibility is a feature of the new T-40, for steering clutches, transmission and brakes may be easily inspected, adjusted or removed through the top and rear cover plates without disturbing the track, track frame or driving sprocket. The large positive-acting plate steering clutches, a new crawler-tractor feature, are in the rear compartment of the main frame. The steering brakes are immediately to the rear of the clutches. Efficiency of operation is enhanced by the use of 44 ball bearings. The 6-cylinder engine is of valve-in-head design and has removable cylinders of 3⅝-inch bore and 4½-inch stroke. There is a saddle-type mounted heavy transverse spring which carries the front weight of the tractor. Independent A frames keep the tracks in true alignment and also permit free oscillation of each track to conform to the rough ground conditions that are encountered.

The over-all length of the new T-40 is 141 inches; over-all width, 61¾ inches; height over air cleaner top, 65 inches; drawbar height, high, 17 11/16 inches; drawbar height, low, 11 inches; tread width, 47¾ inches; track shoe width, 16 inches; and length of ground contact, 70½ inches. The fuel tank capacity is 45 gallons, and the approximate weight 10,600 pounds. The tractor operates at the five forward speeds of 1¾, 2¼, 2¾, 3¼ and 4 miles an hour and at 2¼ miles reverse.

A Trouble-Proof Tire

A tire which has cushioning qualities equal to or better than a pneumatic, yet has no air pressure within the tire, has been announced by The B. F. Goodrich Co., Akron, Ohio. The "Zero Pressure" tire is designed to provide a snowshoe effect in loose or soft soil or sand, having a tread which deflects readily under load and provides unusual tractive qualities. As the tire is not under air pressure, no penetrating obstacle can damage it or cause delay. The tire consists of a rubber arch built on a slotted steel base for application to solid tire wheels. The piers of the arch are of sufficient size and rigidity to provide ample carrying capacity. The all-rubber arch is very flexible and gives full tread contact. The new type tire affords opportunity for lighter wheel installations than have formerly been used.

The state of Kansas equipped a maintainer with Zero Pressure tires and new light-weight wheels, and a second with a solid tire and the usual heavy wheels, and ran them over a 10-mile stretch. In the same number of working hours the maintainer equipped with Zero Pressure tires was 2½ miles ahead of the unit equipped with solids, an economy of more than 30 per cent in working time and at a considerable saving in gas and oil. Present users include the states of Ohio, Pennsylvania, North Carolina, Missouri and Washington, and the cities of Cincinnati, Ohio and Battle Creek, Mich.

A New Automatically Primed Centrifugal Pumping Unit

A new self-contained automatically primed centrifugal pumping unit comprising an electrically driven high efficiency ball-bearing centrifugal pump, mounted with its motor, on a fabricated steel bedplate, together with a Monobloc priming unit of the wet vacuum type controlled by an electric pressure switch, has been announced by the Worthington Pump and Machinery Corporation, Harrison, N. J. The priming pump is an adaption of the well-known Hytor pump and is licensed to Worthington under patents of the Nash Engineering Co.

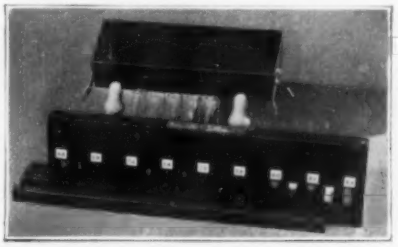
The evacuator motor is connected across the main pump motor line at a point between the starting switch and the motor, so that in starting the motor the evacuator motor also starts. The pressure switch is placed in the evacuator motor circuit, and its pressure connection is piped to the discharge nozzle of the main pump. Whenever the discharge pressure of the main pump is below a predetermined point, the pressure switch is held in the closed position. When the discharge pump comes up to normal, the switch opens and remains open as long as the pressure is maintained. If the pump loses its prime, the discharge pressure naturally drops. The pressure switch thereby is closed, causing the evacuator to operate until the pressure is again built up to normal. A check valve in the evacuator suction line prevents air leakage from the evacuator to the main pump when the evacuator is not in operation.

A Boiler Water Testing Outfit

Two new outfits for controlling the pH and phosphate content of boiler water have recently been announced by W. A. Taylor & Co., Inc., 872 Linden Avenue, Baltimore, Md. Both outfits are similar in design and operation to the slide comparator illustrated, which makes them durable and simple to operate.

All color standards used in these sets, as well as those employed in all other Taylor equipment, are guaranteed to retain their accuracy for a period of five years. The pH outfit contains a new indicator thymol red developed by the manufacturers. The color standard slide contains standards from 8.0 to 11.2 in intervals of 0.4 pH, giving sufficient accuracy for boiler water control.

The phosphate slide comparator employs a method developed in the Taylor Laboratories to eliminate errors due to constituents other than phosphate, such as silicate, iron, etc. Silicates as high as 1.0 per cent as SiO_2, and ferric iron as high as 50 parts per million, introduce no error. Ferrous iron does not interfere at all. The color standard slide contains standards for 5, 10, 20, 30, 40, 50, 60, 80 and 100 parts per million of phosphate as PO_4. Concentrations of phosphate up to 100 parts per million can be determined directly, and higher concentrations can be taken care of by dilution. The reagents employed are very stable. The procedure is simple and easily learned, and only a few minutes are required to complete a test.

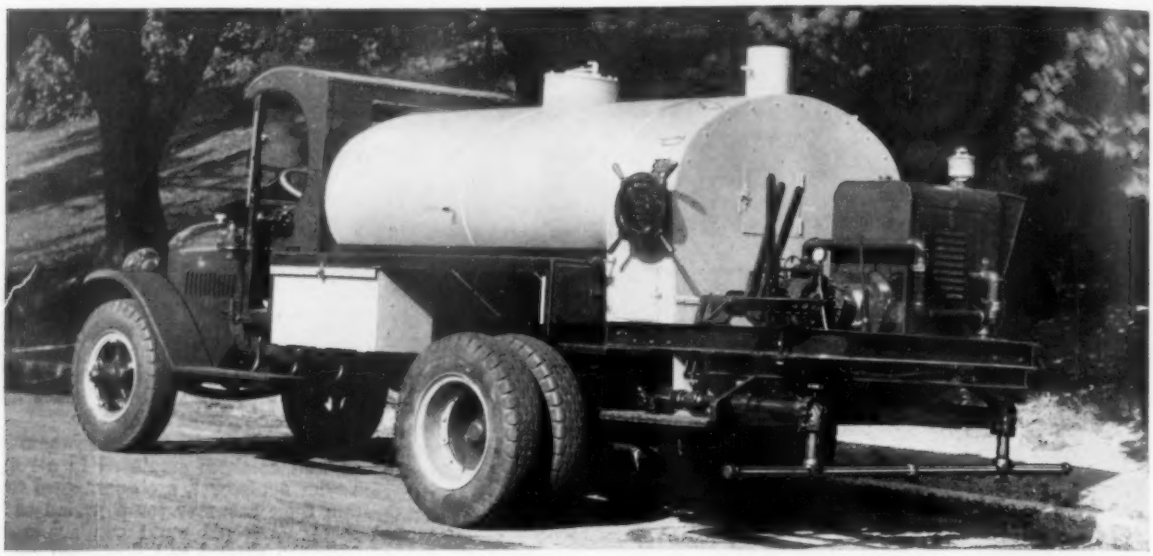


A BOILER-WATER TEST COMPARATOR

New Seattle District Manager

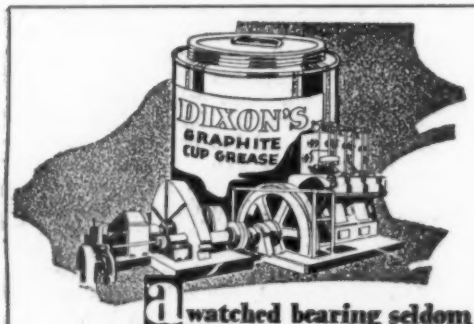
Fred Arnesen, District Manager of the Dallas office of the Merco Nordstrom Valve Co., a subsidiary of the Pittsburgh Equitable Meter Co., Pittsburgh, Pa., has been transferred to assume the duties of Manager of the Pacific Northwest territory, with headquarters at Seattle, where he will have charge of the sales for both companies.

GET THE FACTS
about the Littleford Pressure Distributor



TAKE just a minute to write for complete information about the most easily operated Pressure Distributor ever built. One valve controls flow of bitumen. One Low-Pressure (coilless) Oil Burner does all the heating. Send for the Littleford Distributor Catalog—it gives full details.

LITTLEFORD
Road Maintenance Equipment
SINCE 1900
LITTLEFORD BROS., 500 E. PEARL STREET
CINCINNATI, OHIO



A watched bearing seldom overheats

But who wants to keep an eye —or a hand—on a bearing to be sure it doesn't, when Dixon's Graphite Cup Grease spreads its cooling, smooth, wear-resisting lubrication to every part of the bearing.

In Dixon's Graphite Cup Grease, finely pulverized Flake Graphite—itself a lubricant—is combined with the finest quality greases. Flake Graphite, brought to the bearing surfaces, takes the load and wear — prevents overheating and scoring. There's economy in such lubrication.

Dixon's Graphite Cup Grease is made in six degrees of hardness—No. 3 is recommended for general use

Give Dixon's Graphite Cup Grease a trial on any bearing —you won't have to nurse it to keep it cool.

Write for Circular No. 107-R

OTHER DIXON GRAPHITE PRODUCTS

Flake Graphite	Belt Dressing
Pipe Joint Compound	Graphite Soap
Waterproof Graphite Grease	Industrial Paint

JOSEPH DIXON CRUCIBLE CO.
Established 1827
Jersey City New Jersey

DIXON'S GRAPHITE CUP GREASE

Safe, beneficial action is provided by the 255 different types, sizes and units of recreation apparatus in the EverWear line.

An outfit for every play purpose—the recognized standard of safe and permanent value for playgrounds and swimming pools.

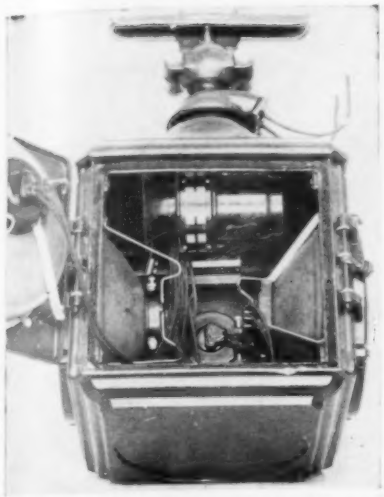
Write for Catalog

The EverWear Manufacturing Co.
Box 103 Springfield, O.

PLAYGROUND EQUIPMENT
WATER SPORT DEVICES

You will find the "American" line a complete one of well designed—well constructed—and reasonably priced — devices for playgrounds and pools.
Send for our catalog and permit us to quote on your next purchase of such equipment.

AMERICAN PLAYGROUND DEVICE CO.
ANDERSON, INDIANA



THE INSIDE OF THE NOVALUX FIRE-SIREN TYPE FLASHING BEACON

Light and Sound Used in New Fire Beacon

Unlike some children, advised by their parents to be seen and not heard, a new type of Novalux fire beacon introduced by the General Electric Co., Schenectady, N. Y., is designed to be both seen and heard. The device is designed for mounting outside fire houses or at street intersections through which fire apparatus must pass on its way to duty. Prompt clearing of fire lanes is obtained by means of visible as well as audible signals. The beacon, in appearance like a traffic signal, has a motor-driven siren within the housing. The construction differs from that of a standard traffic beacon only in the siren.

An Automatic Fire Hero

A fire-alarm which gives an alarm and yet avoids panic has recently been demonstrated before various fire chief organizations as well as school and municipal authorities in a number of eastern cities. The automatic fire hero is a system of apparatus which plays the part of the man who keeps cool and knows just what to do in an emergency. The system has recently been perfected by the Western Electric Co., 195 Broadway, New York, working in conjunction with the Garrison fire-detecting system. Besides the unusual technical features of the apparatus, the use of a voice and a band instead of the traditional fire gong is based on the findings of modern psychology as to the way people react both to emergencies and to different kinds of sound.

By means of electrical devices, the system combines an automatic fire detector with a music reproducer which is connected to loudspeakers. When flame or excessive heat reaches the detector, it responds in three ways. It sends an alarm straight to the fire house, directing the firemen to the side of the building nearest the fire, while in front of the building itself an arrangement of lights shows them in what particular part of it the fire is located. At the same instant, the music reproducer begins playing and is heard over loudspeakers. Third, green arrows light up, pointing out the correct route for exit.

The musical record designed to be used in schools begins with a fanfare of trumpets, followed by a distant siren. Then a calm but commanding voice says: "There is a fire emergency but no immediate danger. You must leave the building. You are drilled in this and know just what to do. Leave your hats and coats, take your places in line. Steady now, don't rush. Follow the green arrows." A brass band strikes up a martial air, and the sound of approaching sirens is heard through the music.

Everything in the record has a definite purpose. The band piece was chosen for its strong marching rhythm. The siren is injected to accustom the children to it in drill so that they will not be frightened when they hear the real thing for the first time. Fire chiefs recommend the command to abandon hats and coats, as experience shows they are likely to be dropped, causing others to stumble.

The automatic fire detector uses special wiring which is sensitive to heat. The core is a fusible alloy enclosed in a steel sheath which is slit along its entire length. At 160 degrees F. the alloy melts and expands forcibly. It spurts through the slit and, making contact with an outer metal sheath, causes a short circuit that sets off the alarm. In actual installation, this wiring is placed throughout a building, and a very small current, enough to spring the alarm, is kept flowing through it.

In the Western Electric Sound System that is used, the music reproducer is associated with an amplifier which may be connected to loudspeakers of any size placed in any number of rooms, hallways and auditoriums. The apparatus is electrically supervised. A small current about equal to that consumed by an ordinary 60-watt electric light bulb keeps the amplifier tubes warm and ready to operate instantly, and also notifies the local technician if the slightest misadjustment occurs. All the vital apparatus in the system is protected in a fireproof vault.

Austin-Western to Distribute Cletrac over a Wide Territory

The Austin-Western Road Machinery Co., Chicago, Ill., domestic sales organization of The Austin Manufacturing Co. and The Western Wheeled Scraper Co., has announced that it will handle the industrial sales and service of Cletrac crawler tractors in 24 states, broadly the territory covered by the midwestern, southern and southeastern states. The present Cletrac organization continues to handle nation-wide agricultural sales, and industrial sales and service in all territories except North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, Minnesota, Iowa, Missouri, Arkansas, Louisiana, Wisconsin, Illinois, Indiana, Michigan, Tennessee, Mississippi, Alabama, Florida, Georgia, South Carolina, North Carolina, Virginia and West Virginia.

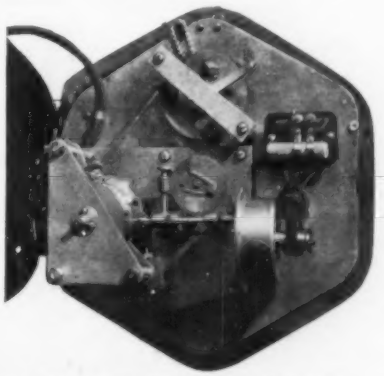
The New Electrically Operated Flow Meter

Wide measuring range, accuracy and abundance of power are features of the new electrically operated meter known as the "Chronoflo Meter," which has been announced by the Builders Iron Foundry, Providence, R. I. The meter furnishes a chart record reliable to 1/12 of the maximum rate and a total flow register accurate to 1/20 of the maximum flow. This will appeal particularly to those who use flow meters where there are wide seasonal, day and night, or hourly variations in the rate of flow. The Chronoflo instrument, which may be used with either a venturi tube or an orifice plate, utilizes four products of modern electrical research—the Telechron motor, mercury switch, power relay and electro-magnetic clutch—as the foundation for its operation.

Essentially the instrument consists of a Telechron-driven contact device controlled by the height of the mercury column in the mercury unit which indicates the rate of flow through the orifice or venturi tube, and a Telechron-driven register-recorder which is in operation during the exact time that the mercury switch is "on," in the mercury unit. The mercury switch is sensitive to minute changes in mercury level; the power relay instantaneously transmits the contact engaging the Telechron drive with the integrating and recording movement through the electro-magnetic clutch.

Thus the Chronoflo utilizes the remarkable accuracy of the Telechron, and the equally important fact that this accuracy is exactly duplicated by other Telechrons anywhere on the same frequency-controlled electrical system. For the meter user this means that there are practically no limits to the distance allowable between the pipe line and the register-recorder, since for exceptionally long distances the standard public telephone system circuit can be used.

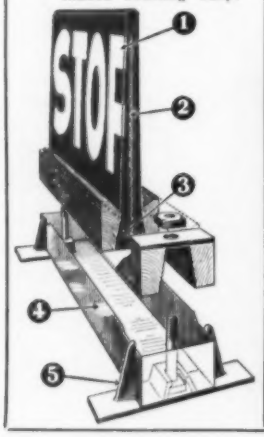
Other features include the hexagonally-shaped case, which makes a particularly pleasing appearance on the panel and allows the use of a long side hinge, which, in turn, allows the mounting of all the working parts on a single plate which can be swung out from the case for easy inspection.



THE CHRONOFLO REGISTER-RECORDER WITH THE HINGED CASE SWUNG OPEN

GENERAL *Sure-Stop* TRAFFIC MARKER

1. Thick letters are inlaid, cannot wear off.
2. Fabric reinforcement insures upright position.
3. Wedge shaped base holds rubber slab firmly in place.
4. Aluminum case embedded permanently in pavement.
5. Brass anchor plate and bolt cannot rust; makes refilling easy.



What others say:

A Detroit official: "At the intersection, since the signs were placed, no serious accidents have taken place."

A Wichita official: "They have reduced accidents at least 65%."

A Pontiac official: "Placed at fourteen 'stop' streets last spring, they already, by lessening accidents, have earned their initial cost many times over."

General Sure-Stop Traffic Markers have proved their worth in more than 2,000 cities. Ask your local General Tire dealer about them, or write to the address below for further information.

Material: A flexible rubber panel, with creosoted wood base; brass anchor plates enclosed in aluminum case.

Size: 22" long, 7" high.

Color: Letters of Federal yellow rubber vulcanized into black rubber background.

Simple to install: Simply cut a slot in the pavement 4 to 5 inches wide. Insert the marker and pour asphalt or concrete around it. To install refills, simply unscrew the nut at each end of base, and lift out the old marker.

THE GENERAL TIRE & RUBBER CO.,
Akron, Ohio

This Tar Kettle

OUTLASTS
2 to 3 ordinary kettles

You pay no more for a Chausse boiler-plate tar-and-asphalt kettle than for a light, thin, sheet-steel kettle — and you get a kettle that last two to three times as long! *"Nuf sed!"* Made in 1, 2, 3 and 6-barrel sizes. Hand spray pumps, warming hoods and barrel hoists furnished if desired.

Other Chausse products—Street Repair Plants, Surface Heaters, Fire Wagons, Concrete Mixer Heaters, Kerosene Torches.

Write for illustrated catalogs

Chausse Oil Burner Company
Elkhart Indiana

STREET LIGHTING

Standard Pressed Steel Poles are of pleasing design—easy to erect—of long life and require little maintenance. Engineers desiring modern, economical lighting equipment will profit by consulting Standard.

LOW COST

CONSULT STANDARD

Standard also offers a line of cable boxes for underground transmission. These boxes although standardized in general design are capable of variation in detail to meet specific conditions. Consult us now.

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CABLE BOXES

STANDARD SUPPLY COMPANY
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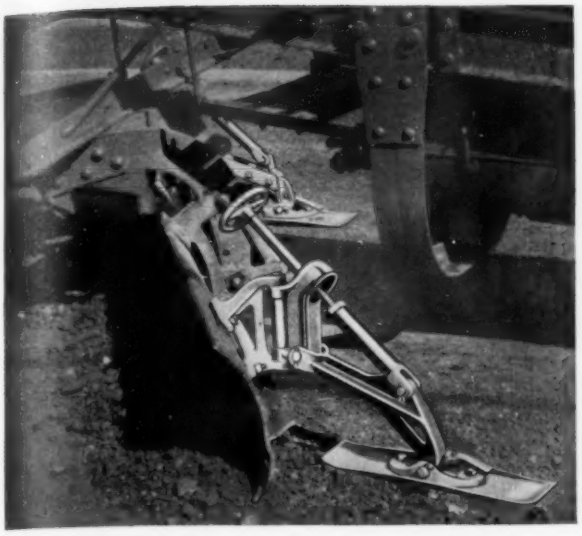
"EARLY SIGNS"
THE ORIGINAL AND MOST POPULAR

IN USE IN OVER 400 CITIES AND TOWNS

Porcelain enamel plates are guaranteed for 10 years against fading or chipping.
Certified malleable iron frames and staff. Adjustable to any angle. ***Agents Wanted***

SEND FOR SAMPLE HEAD FOR COMPARISON

TRAFFIC AND STREET SIGN CO.
86 Foundry Street **Newark, N. J.**



THE CHATABATOR, A DEVICE FOR THE ELIMINATION OF MOLDBOARD CHATTER

A Device to Eliminate Moldboard Chatter

The Chatabator is a device for attaching to the moldboard graders to prevent chatter. The runners carry the pressure instead of the cutting edge and take all the slack out of the grader mechanism. The Chatabator, made by the Rosco Manufacturing Co., Minneapolis, Minn., does not allow the blade to follow the contours of the road, but forces it to trim and fill chuckholes and washboards as it goes. It also eliminates the tendency to loosen too much material in dry weather. With these devices, it is not necessary to windrow the material, since drifting or spreading can be done at any rate of speed without the danger of chatter.

The extra-heavy Chatabator has an 8-inch runner and is for the heavier graders. In certain localities power patrols are used for snow-removal work. In this operation there is danger of throwing a large portion of the gravel off the road. The patrol is equipped with these devices and can maintain a speed of 10 miles an hour and not touch the road surface.

A Three-Unit Bituminous Paver and Finisher

The bituminous paver and finisher announced by Barber-Greene Co., Aurora, Ill., some time ago is now being manufactured as a three-unit machine, thus increasing its utility. What was previously the paver is now two units, consisting of a special loader as the first unit and the mixer as a second unit. The finisher is practically the same as before, with the exception of some minor improvements.

The loader is of large capacity and may be used for grading, light excavating, loading excess dirt that must be hauled away, stock piling and reclaiming. The loader may be run through the windrowed stone for aerifying, drying and replacing in the windrow ready for processing when the loader is returned to the mixer. This method is considered superior to blading the windrow back and forth, because it is thorough, clean and rapid.

The new design of the loader used with the mixer includes two 400-gallon tanks for carrying a supply of oil or asphalt on the loader itself. The mixing unit when used with the loader is attached by means of a kingpin and trails on its own wheels or Athey wheels, being towed by the loader. This unit is equipped with an 82-horsepower plant and has a positive feed pump driven through the same countershaft as the apron feeder which measures out the aggregate. The pump takes the oil or asphalt from the supply tanks on the loader and delivers it to the spray nozzles in the spray chamber. This connection is through flexible hose and piping but has no relation to the pump on the loader. The power plant also drives the double pugmill and has ample capacity to insure operation in fine aggregate and heavy materials, and at high altitudes.

Sterling Acquires La France-Republic Sales Corporation

Sterling Motor Truck Co., Milwaukee, Wis., has announced that negotiations have been completed for the acquisition of the motor-truck division of the La-France-Republic Sales Corporation, Alma, Mich.

Tax Experts Engaged

Elmer J. Schnackenberg, Secretary of the Illinois Commission on Taxation and Expenditures created by the General Assembly at its last session and Chairman of its Sub-Committee on Consolidation of Local Government, has secured the aid of Griffenhagen & Associates, Chicago, Ill., in devising its plan, estimating the savings and drafting necessary legislation.

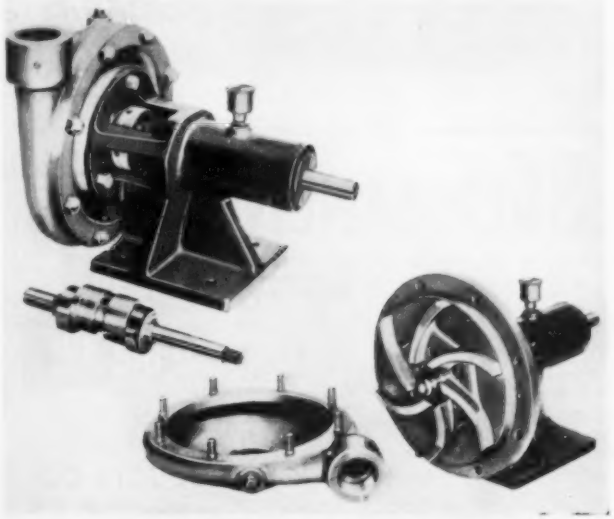
A Small Centrifugal for Chemical Solutions

A small pump with a maximum capacity of 100 gallons a minute has been developed by the Hills-McCanna Co., 2349-59 Nelson Street, Chicago, Ill., for handling the chemical solutions used in water-works practice. On this pump the inboard and outboard head and impellor are separate units, so that it is possible to make these parts from any commercial material. Hard rubber and Hasteloy, of which the pump is made, are both satisfactory materials for use in handling chlorine solutions. Alum solution is satisfactorily handled with the aluminum bronze unit. The pumps are primarily designed and built to provide a means for greater capacity for each horsepower used, to reduce maintenance costs to a minimum, and to render long service.

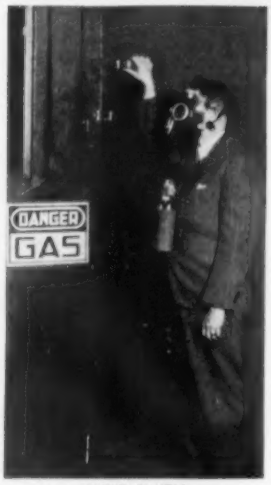
The shaft and impeller alignment is accomplished by providing ball bearings to carry the load in any direction. Not only does this construction lengthen the life of the pump, but it reduces friction losses and permits unusually close tolerance in fitting the impeller in the housing, which increases the delivery for each horsepower used.

The stuffing box is of the split screw gland type, which will always pull up square, permits proper seal with the minimum pressure, and can easily be packed. There is no bearing in back of the packing, which eliminates the possibility of lubricant entering the pump and mixing with the liquid handled.

The pump has removable inboard and outboard heads, which is a feature of value when handling fluids that are highly corrosive, such as a solution of chlorine, for it is only necessary to replace the heads and impeller. When it is necessary to have equipment taken apart to be cleaned, the nuts that attach the inboard and outboard heads are replaced with large wing nuts that can be tightened without the aid of tools.



THE COMPLETE HILLS-McCANNA CHEMICAL SOLUTION PUMP AND ITS COMPONENT PARTS



CHIEF SMITH

PROTECT Your Men

Richard Lee Smith, Chief of the Pittsburgh Fire Department and 250 members recently completed Gas Chamber Tests and Training in the Laboratories of the Mine Safety Appliances Company, wearing BURRELL ALL-SERVICE GAS MASKS of which the department has 139 in service.

These firemen entered High Concentrations of Poisonous Carbon Monoxide Gas, so frequently encountered in Fire Fighting, which would have been fatal in a few minutes time without the protection of BURRELL ALL-SERVICE MASKS!

Bulletin 49 Gives Full Details of This Mask
The Only Canister Mask That Gives Adequate Protection

Mine Safety Appliances Co.

Braddock, Thomas and Meade Sts., Pittsburgh, Pa.

DEPARTMENT DEMONSTRATIONS GLADLY ARRANGED

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FOR EVERY TRAFFIC CONTROL JOB

CITY officials find a wealth of valuable assistance in the Lyle Catalog of "Practical Solutions." Our constant contact with literally thousands of American municipalities has resulted in the satisfactory solution of their many traffic problems. Possibly you are now confronted with a problem that this helpful book can clear up for you. If you are a city official, it will be mailed to you free of charge.

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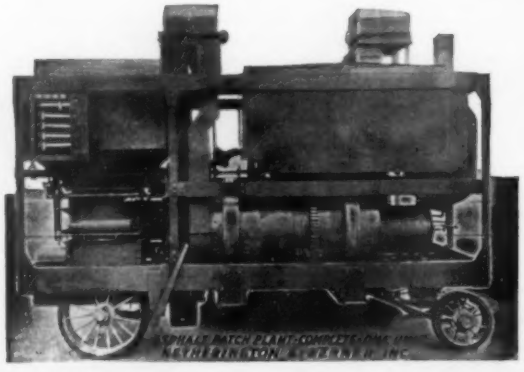

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Send for Bulletin R-400

HETHERINGTON & BERNER, INC.
INDIANAPOLIS, IND.

Stationary — Railway — Portable & Semi-Portable Plants

PERMANENCE

Is an inherent characteristic of Brass street signs. Brass, the non-corrosive metal, is used in their construction.

Write for a list of Brass street sign installations that have stood the test of time.

Catalog sent on request

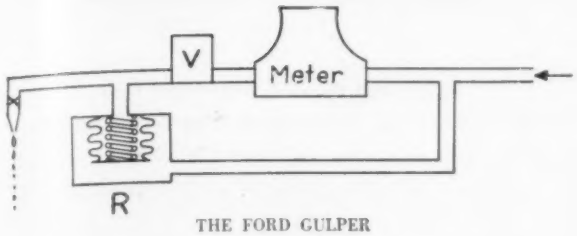
UNION IRON PRODUCTS CO.
Department H **East Chicago, Ind.**

Water Works Manager and Street Superintendent Available

A competent Water Works Manager and Street Superintendent desires to make a change. Has been in charge of present prosperous business over a period of twenty years. Competent to make surveys for street paving and drainage. Best of references.

Address Box 173

Care of The American City
470 Fourth Ave., New York



THE FORD GULPER

A Device for Increasing the Accuracy of Water Meters

It is a well-known fact that very small leaks from pipes or faucets in a house are not recorded by water meters. In order to increase the accuracy of the meter and secure the revenue from small leaks, the Ford Meter Box Co., Wabash, Ind., has developed a device known as the "Gulper" which accumulates the trickle until a definite volume is reached and then permits it to go through the meter in a short period of time in a larger flow which is recorded accurately.

The accompanying diagram shows the "Gulper" in diagrammatic form. The valve "V" remains closed and prevents any flow through the meter until there is a difference of pressure of about 5 pounds, across the meter and valve. Water drawn from the system until this difference of pressure is reached is supplied from the reservoir "R," or from the inside of the spring-resisted metal bellows, which is more and more compressed as the difference of pressure across it is increased until this difference is enough to open the valve "V."

When this point is reached, the valve opens instantly, the pressure across the bellows is nearly equalized, the reservoir is refilled at a rate of flow through the meter at which it can register accurately, and then the valve closes.

Opening, refilling the reservoir, and closing require only a fraction of a second, during which a fully registered refill of the reservoir is effected. The rate of draft at which the reservoir is emptied, whether it be at one gallon per day or one gallon per minute, is immaterial. If the rate of draft is above any predetermined rate, say, one gallon per minute, at which the meter can register accurately, the valve remains open and does not absorb more than one pound of pressure.

New Standardized Line of Diesels

Covering power requirements from 50 to 1,000 horsepower, in 2- to 8-cylinder units, an improved line of 4-cycle direct-injection moderate-speed diesel engines for stationary and marine services has been announced by the Worthington Pump and Machinery Corporation, Harrison, N. J. Among the features of construction of these diesels are, individual fuel pumps for each cylinder with fuel lines of equal length and hydraulic control of fuel injection. Individual air-starting pilot valves control the admission of starting air to each cylinder and the spray valves are pressure actuated, no push rods or levers being used.

The lubricating oil is circulated through a cast-in main duct in the base with cast-in branches leading to the bottom of each main bearing by an attached pump. These diesels can easily be converted to operation on manufactured or natural gas, the same base, frame, crankshaft and connecting rod being used for both engines. When running on gas, a magneto and spark plugs replace the fuel pumps and spray valves, a mixing valve is bolted to the end of the regular inlet manifold, and gas engine cylinders with larger valves in the heads are substituted.

A Double-Duty Traffic Sign

Traffic caution signs can become too cautious and hence cry "wolf" once too often. It has become a habit for police departments and school authorities to display school caution signs along the roadside in great profusion to warn motor drivers of the proximity of children. All automobile drivers are likely to become lax with the ever increasing display of these signs and with no indication of groups of children in the vicinity. The A-B-C Traffic Signal Co., Coal Exchange Building, Scranton, Pa., manufactures a hinged sign which when open announces the beginning of a school zone, and when the lower section is folded up over the top it spreads the gospel of safety in the well-known "Always Be Careful" or its initials. The signs are made of high-grade aluminum with the letters flanged with rim, ribs and top staple of the same casting. The special hinges at the sides are also part of the casting, and when the signal is open the space between the halves is scarcely discernible. When closed, a neat fit is effected at the rims.

The signal is octagonal and is available is two sizes, 24 x 24 inches or 18 x 18 inches. The post on which the sign is mounted is constructed of channel steel in standard weight and measurements and punched with 36 $\frac{3}{8}$-inch holes 1 inch apart. The sign is enameled yellow with black letters, the aluminum base giving lasting quality to the paint job.

A FOLDING SIGN

THE CHAPMAN LIST 88 HYDRANT

A Compression Fire Hydrant

A compression fire hydrant which permits rapid draining and which may be repaired economically is manufactured by The Chapman Valve Mfg. Co., Indian Orchard, Mass., and sold under the title "List 88." The underside of the flange connection between the barrel or standpipe, and the body, or post, is two inches above the ground line. This meets the recommendation of waterworks superintendents that hydrants have the barrel and post made in two sections. Thus the flange connection is easily accessible in case repairs are necessary and the internal parts of the hydrant must be removed. It also eliminates the possibility of damage to the hydrant connection with the water main. The Chapman List 88 hydrant opens against the pressure and closes with the pressure. It is so designed that in case the post or barrel is broken by sudden impact or gradual pressure, thereby relieving the tension of the operating screw and rod with the hydrant seat, the water pressure will hold the valve to its seat and no flooding can result.

The seat or disc of the List 88 hydrant is supplied of leather, rubber or any special composition specified. The drip plate, drip seating and unseating spider and the seat ring are made of special hard bronze composition. The operating rod is of steel square stock. The threaded operating nut is of bronze composition. The elbow or valve and seat housing is provided with lugs so that the connecting pipe may be anchored if desired.

Outdoor Lighting

A Section of *The American City* Devoted to the Lighting of Streets, Highways, Bridges, Airports, Athletic Fields and Parks, and the Floodlighting of Public Buildings

Fewer Traffic Fatalities with Increased Street-Lighting Expenditures

By **R. E. SIMPSON**
Engineer,
The Travelers Insurance Co., Hartford, Conn.

IN connection with the survey of traffic accidents in the evening rush period of 46 cities reported in the July issue of *The Travelers Standard*, and in briefer form on page 106 of THE AMERICAN CITY for August, the relationship of expenditures by these cities for street lighting and the number of fatalities in each, was one of the matters investigated. To determine this, a chart was prepared upon which the fatality rate per 100,000 population during the period from 5 to 8 p. m. for the winter months (October, November and December, 1931, and January, 1932) and the summer months (May, June, July and August, 1931), respectively, for each city were plotted against the per capita expenditure for street lighting. This showed an unmistakable downward trend of the fatality rate as the per-capita cost of street lighting increased.

From the original chart another, which is shown herewith, was prepared to show the average indicated by the irregular graph resulting from the first plotting.

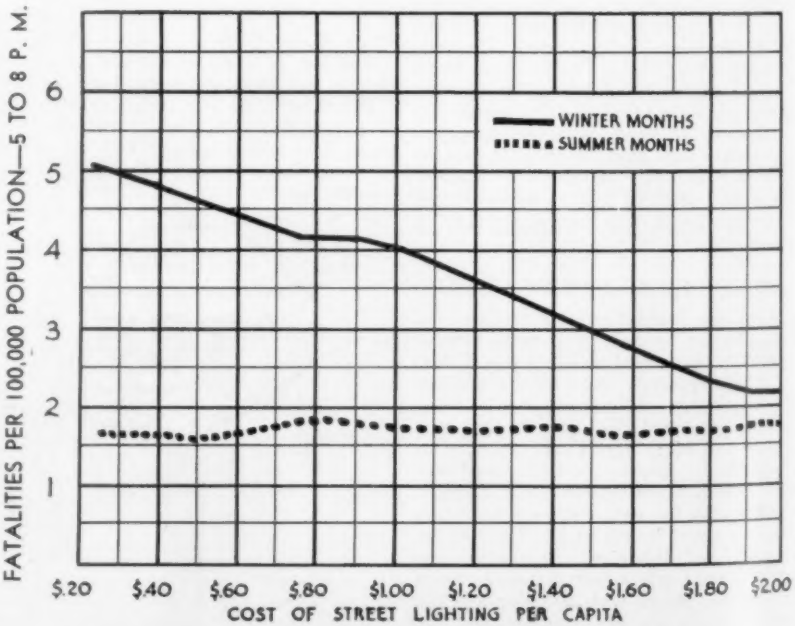
Results by Population Groups

Twenty cities reported a per-capita cost for street lighting of one dollar or less. In these cities, of the total fatalities occurring between the hours of 5 p. m. and 8 p. m. of the eight months reported, 71 per cent occurred in the winter months and 29 per cent in the summer months. Ten cities reported per-capita street-lighting costs of $1.00 to $1.25, with a fatality rate of 65 per cent in the winter months and 35 per cent in the summer months. Eight cities reported a per-capita street-lighting cost of $1.25 to $1.50, with a fatality rate of 57 per cent in winter and 43 per cent in summer; and eight cities reported street-lighting costs between $1.50 and $2.00 with a fatality rate of 51 per cent in winter and 49 per cent in summer.

There were some outstanding exceptions: one city having a per-capita street-lighting cost of 64 cents and a population in excess of 250,000, had nine fatalities in summer, and three in wintter, while another city having 81 cents per-capita cost and a population of nearly 300,000, had ten summer fatalities and only two winter fatalities. At the other extreme is a city in excess of three-quarters of a million population, spending $1.86 per capita for street lighting, with a record of three accidents for summer and twenty-seven in the winter; while a fourth city of more than 300,000 population, spending $2.04 per capita for street lighting, had two summer accidents and seven winter accidents. We know that in two of these cities there were two disastrous grade crossing accidents accounting for a total of eleven fatalities. There may have been some other local factors which would tend to throw the returns from these cities out of line with the general trend.

The lowest per-capita cost reported was 24 cents. There were two other cities reporting exceptionally low per-capita costs. All three of them have municipal lighting plants and the street-lighting figures are probably not complete enough to be comparable with contract prices.

The information from the 46 cities was sent on the understanding that the assembled data was not to be published in such a way that a city's identification was possible, but the group figures given above, together with the chart, demonstrate the point that adequate spending for street lighting pays in the saving of human life.

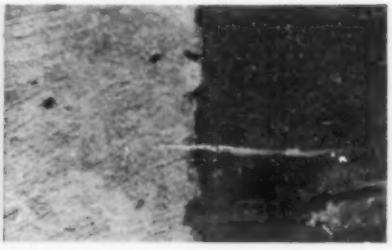


RELATIONSHIP OF STREET-LIGHTING EXPENDITURES TO TRAFFIC FATALITIES IN 46 CITIES

Street-Lighting Fundamentals Illustrated

The photographs below are from the collection of C. A. B. Halvorson, consulting engineer for the Street-Lighting Division, General Electric Co., West Lynn, Mass., used by him in a lantern-slide demonstration of the Illuminating Engineering Society's Code of Street Lighting; 28 more of these appear in the 1932 Municipal Index, pages 411-414. The quotations are from the Code.

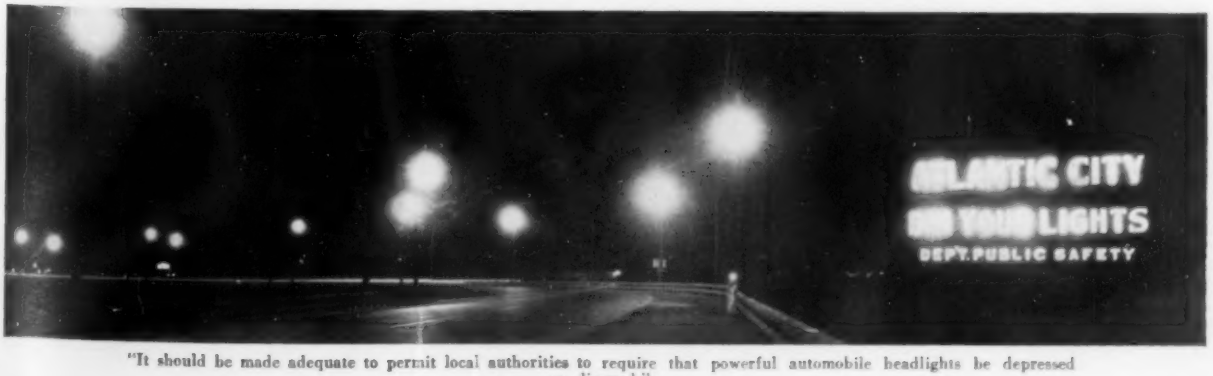
"The lighting for a street should be designed with due regard to the type of street and its traffic—



"The characteristics of the street surface— [These photographs show different characteristics assumed by a street surface, depending upon the direction from which the light strikes the surface.]

"The types of buildings along the street—

"And the presence or absence of trees.



"It should be made adequate to permit local authorities to require that powerful automobile headlights be depressed or dimmed."

Holyoke Installs Highway Lighting on Important Route

By ROBERT B. ELY
Illuminating Engineer,
Westinghouse Electric & Manufacturing Co.,
Boston, Mass.

NEW LIGHTING ON NO. 5 HIGHWAY, HOLYOKE, MASS.

OUR highways are being beautified by attractive landscaping, architecturally designed bridges and underpasses, while unsightly bill-board signs are gradually being eliminated, so that in some instances the cost of such roadways exceed $100,000 per mile. Yet, when it comes to a consideration of the lighting equipment to effectively illuminate the highway, the cheapest type of equipment is frequently considered too expensive.

Doubtless our highways will eventually be lighted, as a reduction in losses due to accidents will justify the expenditure. Some very good example of what can be done in lighting highways have been demonstrated in some of the New England states. One of the more recent installations of highway lighting has been made under the supervision of Arthur W. Darby, Superintendent of the municipal electric light department of Holyoke, Mass.

The installation is on U.S. Highway No. 5 in Holyoke at the base of Mt. Nonotuck from the junction to Smiths Ferry. It consists of 22 Westinghouse Hi-lux lighting units with 4,000-lumen (400- cp.) Mazda street series lamps, spaced approximately 300 feet apart with a mounting height of 33 feet to the light center.

The lighting unit consists of an 18-inch pipe bracket and a high-voltage wet-process streethood to which is attached a spherical lighting unit. The upper hemisphere is of metal with a chromium-plated interior surface; the lower hemisphere is of prismatic glass consisting of two refractors, so designed as to redirect a broad band of light up and down the roadway with a sharp cut-off of the light at the sides of the roadway. This assembly provides a dust-tight and waterproof unit that will require a minimum of attention.

ONE OF THE Hi-LUX UNITS

The mounting of the lighting unit close to the pole permits lamp replacements and cleaning of globes to be done without any special maintenance wagon or equipment. The public comment on the lighting from those traveling this highway at night is very favorable.

The state of Massachusetts has developed many splendid highways that lack nothing but the necessary lighting equipment to increase their usefulnes and promote the movement of freight hauling by night, in addition to decreasing the annual toll due to accidents.

The highway lighting in Holyoke shows what can be done and demonstrates a noteworthy example of the foresight and accomplishments of the city's electric light department through its Manager, J. F. Kirkpatrick, and Superintendent Darby.

Floodlighting the Arch of Triumph

Batteries of floodlights serve to reveal at night as well as by day the beauty of the Arch of Triumph, which stands at the convergence of several of the leading boulevards of Paris, and under which lies the world-famous Tomb of the Unknown Soldier

Bracket Lights in Center Parkway

The Department of Public Utilities of Richmond, Va., has installed ornamental lighting fixtures of the type shown herewith, on Hermitage Road. Two brackets are mounted on opposite sides of concrete poles in a grass plot in the center of the road. The poles are 115 feet apart; alternate poles are thus equipped, making a spacing of 230 feet between lights. The brackets are mounted on cast iron back plates designed by the Department, secured by means of galvanized iron straps concealed by ornamental side plates. Lamp centers are 18 feet 1 inch from the road surface. The brackets are the Westinghouse Columbian type, and are equipped with General Electric medium alabaster rippled globes and canopies; 4,000-lumen Mazda series street lamps are used, on a 7.5-ampere circuit.

OCTOBER, 1932

The American City

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whether relating to the extinguishing of fires or the extinguishing of unemployment—
Are Essentials of Farsighted Public Policy
(See pages 5 and 83 of this issue)

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page 51)